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UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

REGION ONE

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REPORTS  
Annual

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WHITE PINE BLISTER RUST CONTROL

Calendar Year 1957







UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

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WHITE PINE BLISTER RUST CONTROL

Calendar Year 1957

This report was prepared from information submitted by the several forests and under the direction of the Chief of the Division of Blister Rust Control in Region One.

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WHITE PINE BLISTER RUST CONTROL

I. SUMMARY OF ALL BLISTER RUST CONTROL PROGRAMS

This report covers three control programs: National Forest, State and Private, and National Parks. Under cooperative agreements with the respective agencies, the U. S. Forest Service provides leadership and technical direction for all programs and performs such operational and project management services as requested by the cooperating agencies. Also reported are the principal developments in chemical methods and ribes ecology and in rust resistant white pine.

The following agencies are conducting or actively cooperating in white pine blister rust control:

U. S. Forest Service  
National Park Service  
State of Idaho  
Clearwater Timber Protective Association  
Potlatch Timber Protective Association  
Priest Lake Timber Protective Association  
University of Idaho

Acreage worked in 1957 greatest since 1940. The 86,890 acres worked in 1957 is 63 percent greater than the number worked in 1956 and exceeds the acreage worked in any year since the emergency relief work programs started to close in 1940. All field units contributed to this increase, which was brought about by two principal developments in field methods plus good seasonal labor in 1957.

Checker-flanker work method. The area is becoming larger from year to year on which ribes have been sufficiently suppressed to permit rework and maintenance by extensive checker-flanker methods. This type of work accounts for most of the acreage increase. In 1957, 30,800 acres, as compared to 9,870 acres in 1956, were worked in this manner at an average rate of 16 acres per man day.

Improvement in regular work. More significant from a cost standpoint than the large acreages worked by checker-flanker methods is the greater production per man day in regular intensive ground coverage. This class of work, which used 96 percent of the man days, increased from 43,540 acres in 1956 to 56,180 acres in 1957. In 1957, 1.19 acres were worked per man day as compared to 0.95 acres in 1956, a 25 percent increase in production representing a value of about \$364,000. The 1957 production was also about 20 to 25 percent greater per man day than in 1954 and 1955. Effective man days in 1954 and 1955 were adjusted to the present man-day base.



High quality of seasonal labor in 1957. From applications which exceeded many times the number of jobs open, it was possible for all field units to select good men. The labor turnover during the season was negligible - a very important factor in getting high production.

Changes in field procedure. Increasing the size of work lot from 1 acre and  $\frac{1}{4}$  acres to  $1\frac{1}{2}$  acres was the major change in field procedure in 1957. This change along with efforts to increase speed of work and width of cross strips in a lot is believed responsible for the high man-day production in 1957.

Analysis of individual work performance in 1956. The changes made in field procedure in 1957 were the result of an analysis of individual work performance in 1956. Since a lot, an area 5 chains by 2 or  $2\frac{1}{2}$  chains as used in 1956 or 5 by 3 chains as used in 1957, is the basic work unit assigned to a worker, attention has been focused in the past several years on every detail connected with it for possible leads for increasing production.

The 1956 analysis was made possible by the introduction of a new lot report form which was employed by one forest in 1955 and at least on part of the operations in all forests in 1956. In 1957 the report form was used throughout the entire project. The new lot report form in addition to the hours worked and the ribes pulled required the worker to show the strips which he took across a lot and where ribes were found on a strip. The lot report also showed checking results. The regional office called in these lot reports from the forests after the 1956 season. A statistical analysis of them showed the following: (1) a high proportion of the lots whether 1 acre in size as used on one forest or  $1\frac{1}{4}$  acre in size as used on the other four forests were being worked in either four or eight hours, indicating that a worker was satisfied in too many cases to work one or two lots regardless of lot size and his ability; one lot in normal going and two lots in easy going; (2) efficiency in ribes eradication increased moderately with increases in speed of work up to reasonable rates of speed; and (3) both efficiency and speed of work increased with increases in width of strip up to reasonable widths. While work pace and width of strip are governed to a certain extent by ground conditions, the effect of speed and strip width on ribes efficiency shown in these analyses is similar to that found in controlled experiments conducted in years past.

Controlled checking studies in 1955 and 1956 showed checking to be more reliable on  $1\frac{1}{4}$ -acre lots than on 1-acre lots and especially on lots where the new lot report form was used.

Analysis of individual work performance in 1957. Analysis of 1957 work has not been completed, but the following trends are indicated: (1) Arrangement of the  $1\frac{1}{2}$ -acre lots according to man hours per lot follows a more normal distribution pattern than for the smaller lots worked in 1956 although in some camps the number of lots worked in four and eight hours is still high. In either case, the advantage of the  $1\frac{1}{2}$ -acre lot over the smaller lots used in 1956 is strongly indicated. (2) The cross strips in a lot were predominately wider in all ribes classes in 1957 than in 1956, which, according to the 1956 analysis, should increase both production and efficiency. (3) The efficiency of ribes eradication was more uniform in 1957 regardless of greater speed and wider strips, indicating that 1957 work attained more satisfactory rates and widths than in 1956. The same ribes eradication efficiency standards were required in both years.



Time studies in many industrial fields show that fast work promotes high concentration and fewer errors. In ribes eradication, fast work and wide strips can also promote high concentration. The more uniform ribes efficiency in 1957 regardless of the number of man hours and cross strips per lot would indicate that ground conditions rather than dilatory progress on the part of the worker were responsible for the lots in the high man hour and cross strip classes. In 1956 there was a decrease in ribes efficiency as number of hours and number of cross strips increased.

In determining the most satisfactory size of lot, there are psychological and physical factors to be considered. It is recognized that size of lot or its dimensions have no significant inherent characteristics which would either aid or hinder a man in his work. In other words, he should work as fast in a large lot as in a small one. From a psychological standpoint, it is evident from data secured thus far that the  $1\frac{1}{2}$ -acre lot is preferable to the 1- and  $1\frac{1}{4}$ -acre lots. It would seem from the data that  $1\frac{1}{2}$  acres should be close to the optimum size. A larger size could have an adverse psychological effect by making it too difficult for a man to achieve certain working goals.

From a physical standpoint, the size and dimension of the  $1\frac{1}{2}$ -acre lot (5 ch. x 3 ch.) have certain advantages. Less time is required to string 3-chain lanes than the  $2\frac{1}{2}$ - and 2-chain lanes of the smaller lots. The 3-chain width may represent a maximum that can be conveniently handled with draglines. Some trouble was experienced in the breaking of the longer lines, but this seemed to occur where lines were spliced to make them long enough or were old and needed replacement.

Killing blister rust trunk cankers. Following the successful experimental work with acti-dione in 1956 in killing trunk cankers, several forests employed the procedure to save crop trees in white pine plantations and natural pole-sized stands. An expansion in the use of this treatment will be made in protected stands where blister rust infection took place in damaging amounts ahead of ribes eradication.

Forest Genetics Unit at Moscow, Idaho. The U. S. Forest Service and the University of Idaho entered into a long-term agreement under which the University made available to the Forest Service the use of certain University lands: a 2-acre site for a combination office-laboratory building, a combination greenhouse-potting shed-lathhouse building, a garage, and a small nursery; and a 40-acre field for use in breeding elite rust resistant white pine, developing seed orchard techniques, and conducting other work in forest genetics. The use of these farmlands which can be cultivated, watered, and fertilized will shorten the period considerably to the time when rust resistant white pine seed can be produced in quantities for extensive field plantings.

Spread of the rust. No new infection locations were found in 1957 outside the known southern and southeastern limits of the rust, although considerable intensification was found in most of the outlying centers previously reported.

## 1. Blister Rust Control Expenditures, Calendar Year 1957

State	U. S. Forest Service Region One					National Park Service	State and Private	Totals
	720	042	411	K-V	Total			
Idaho	\$103,947	\$759,716	\$ 98,256	\$63,723	\$1,025,642	\$ -	\$107,700	\$1,133,342
Mont.	17,963	70,936	-	-	88,899	20,099	-	108,998
Wash.	13,725	163,622	-	10,150	187,497	-	-	187,497
Colo.	2,616	-	-	-	2,616	13,354	-	15,970
Wyo.	8,188	-	-	-	8,188	76,942	-	85,130
Total	\$146,439	\$994,274	\$ 98,256	\$73,873	\$1,312,842	\$110,395	\$107,700	\$1,539,937

720 - Leadership and technical direction for all programs

042 - National forest program

411 - Federal funds for State and Private program

K-V - Stand improvement collections used for BRC on national forest lands

## 2. Field Organization, 1957

Program	Camps	Employees	Contractors
National Forest	27	790	19
National Park	7	90	-
State and Private	7	230	3
Totals	41	1,110	22

## 3. Ownership in Blister Rust Control Area

Program	National Forest Acres	National Park Acres	Public Domain Acres	State Acres	Private Acres	Total Acres
National Forest	810,800	-	4,400	24,450	71,330	910,980
National Park	-	52,960	-	-	-	52,960
Idaho State & Private	15,530	-	2,500	62,950	95,680	176,660
Totals	826,330	52,960	6,900	87,400	167,010	1,140,600



#### 4. Total Progress on Ribes Eradication in 1957

Program	Working	Regular	Checker	Total	Man Days	Ribes	Per Acre	
		Work Acres	Flanker Acres	Worked Acres			Man Days	Ribes
National Forest	Initial	5,000	450	5,450	5,700	2,772,000	1.05	509
	Rework	35,150	8,200	43,350	27,690	1,466,260	.64	50
	Maintenance	3,670	15,620	19,290	2,820	41,060	.15	2
	Totals	43,820	24,270	68,090	36,210	4,279,320	.53	63
State & Private	Initial	970	230	1,200	1,370	946,800	1.14	789
	Rework	6,830	460	7,290	6,060	280,630	.83	38
	Maintenance	820	3,790	4,610	1,260	7,840	.27	2
	Totals	8,620	4,480	13,100	8,690	1,235,270	.66	94
National Parks	Initial	1,800	230	2,030	2,020	678,900	1.00	334
	Rework	1,870	1,400	3,230	1,990	103,500	.62	32
	Maintenance	110	420	530	90	2,200	.17	4
	Totals	3,740	2,050	5,790	4,100	784,600	.71	136
All Programs	Initial	7,770	910	8,680	9,090	4,397,700	1.05	507
	Rework	43,810	10,060	53,870	35,740	1,850,390	.66	34
	Maintenance	4,600	19,830	24,430	4,170	51,100	.17	2
	Totals	56,180	30,800	86,980	49,000	6,299,190	.56	72

#### 5. Chemical Eradication in 1957

Program	Acres	Man Days	Ribes	Gallons
National Forest	1,940	3,420	3,582,900	381,340
State and Private	570	1,160	998,870	130,350
National Parks	1,420	2,020	657,500	47,990
Totals	3,930	6,600	5,239,270	559,680

#### 6. Contract Ribes Eradication in 1957

Program	Number of Contracts	Acres	Man Days	Ribes	Dollars
National Forest	28	1,230	1,110	10,120	\$17,463
State and Private	1	50	60	1,330	808
Totals	29	1,280	1,170	11,450	\$18,271

7. Acres in Control Area

Program	Total	Age Classes by Stand Origin					
		1941- 1960	1921- 1940	1881- 1920	1841- 1880	Before 1841	Non- Forest
National Forest	910,980	37,590	186,420	277,110	52,120	355,440	2,300
State & Private	176,660	30,530	56,670	45,850	6,560	36,350	700
Totals	1,087,640	68,120	243,090	322,960	58,680	391,790	3,000

8. Summary of Control Status

Program	Total Acres	Unworked Acres	Needing Rework Acres	Worked Area	
				Needing Re-examination Acres	On Maintenance Acres
National Forest	910,980	232,490	140,140	248,000	290,350
State & Private	176,660	34,580	35,920	44,180	61,980
National Parks	52,960	24,930	4,030	3,480	20,520
Totals	1,140,600	292,000	180,090	295,660	372,850



## II. NATIONAL FOREST PROGRAM

Progress. Progress on the National Forest program in 1957, along with the other programs as described in the opening summary of this report, was exceptionally good. A total of 68,090 acres was worked in 1957 compared to 41,000 in 1956 and 26,140 acres went on maintenance in 1957 compared to 18,650 in 1956.

Field meetings. In 1956 the Division of Timber Management initiated a white pine marking school on the Clearwater to develop in forest personnel a full understanding of the white pine marking guides and the necessity for sound application of these guides to meet the blister rust problem. In 1957 schools were held on the Kaniksu and the Coeur d'Alene. (Personnel from the St. Joe and the Kootenai participated on the Coeur d'Alene.) Forest personnel organized the programs and field inspections.

A meeting of blister rust control personnel of the region was held on the Clearwater in October 1957 for the purpose of inspecting control areas and discussing work procedures on the ground. These field meetings are contributing considerably to the proper coordination of timber management practices and plans with those of blister rust control as well as to the general improvement of control methods.

### Clearwater National Forest

The thirtieth consecutive year of blister rust control work in the Clearwater area was characterized by the return of more experienced workers than for many years past, less labor turnover, and over 40 percent more area being placed on maintenance than in any average recent year. Very little time was lost because of firefighting activities.

There was no assistant project officer available during the year until John P. Bushfield was assigned to those duties on December 1, 1957.

All hand eradication work was given an efficiency check by the lot method and was placed in the maintenance category where ground conditions had stabilized. The status check program was brought up to date, using the flanker method, on areas needing this check for current year's work and for all areas in connection with the program for next year.

Three regular camps and one power spray crew were used on national forest lands. One camp worked in Unit 58, French Creek, and also completed some hand work in Unit 16, Rosebud; one camp completed the necessary work in Unit 1, Fan Creek, and one camp finished the needed eradication in Units A-23, Alder, and A-27, Beaver. The spray crew worked in Unit 16, Armstrong.

Two truck-mounted power sprayers were used for practically the entire season in covering 170 acres of broadcast spraying and 270 acres of roadside work in Armstrong. The Fan Creek crew used portable insect sprayers in treating 30 acres of stream type on Eldorado Creek. All camps made full use of any feasible chemical treatment.

All currently scheduled work was completed in the Fan Creek, Alder Creek, and Beaver Creek units. This permitted starting work this year in the protection zone around the proposed Sheep Mountain timber sale and will allow starting the final coverage in the Tamarack and Sylvan areas next season.



Better progress is being made in meeting the total accomplishments of the present five-year program than was the case in previous years. It is expected that by the end of the present period practically all of the objectives will have been met.

The use of K-V funds is increasing each year. The spray work in Armstrong and the hand eradication in Rosebud were financed by K-V funds. Next season K-V work will be started in the Cedars-Trout Creek sale area on the Kelly Creek District and on the Swanson-Deadhorse sale area in the Canyon District. This work will also be continued on various sale areas in the Pierce District.

A small-scale field test using acti-dione in the treatment of infected white pine was established after the close of the regular field season. If the test proves satisfactory, this treatment will be used more extensively, especially in white pine plantations.

By Marvin C. Riley, Forester in Charge

### St. Joe National Forest

The blister rust control program was administered by the forest BRC staffman, C. J. Miller. The assistant, W. F. Painter, supervised all checking and disease survey work. Field activities of six national forest camps were directed by unit supervisors, Ralph D. Kizer and David A. Graham. Each camp was a 35-man unit composed of a camp superintendent, 3 assistants, 1 checker, 2 cooks, 1 cook's helper, and 27 laborers.

Ribes eradication was performed in the following units: North Fork Palouse (160), Strychnine (156), Mannering-East Fork Meadow (155), Ramskull-Willow (116A), East Fork Charlie (117B), West Fork Charlie (117C), Clarkia (130), Cats Spur (132), Keeler-Long Slim (139), Feather-Porcupine (179), Moose (177), Bear-Corral (173-176), and Hog Meadow (164). In the North Fork Palouse, Strychnine, Mannering-East Fork Meadow, and Clarkia units, young ribes were removed from pole stands where disturbance from windthrow and snow damage has caused numerous ribes seeds to germinate and grow. This was the second eradication since the severe blowdown of 1949. Ribes seedlings are still occurring on upturns and other disturbed areas in the pole stands. Work in these stands was accomplished for an average of .55 man days per acre. Nine ribes per acre were removed from the 8,500 acres covered.

The checker-flanker method of eradication was used to removed ribes from 9,700 acres of white pine pole and reproduction. This system is very effective for working areas with few scattered bushes. The checker-flanker work was accomplished for .05 man days per acre over a two-year period.

Eradication work performed on 140 acres of cutover land within the East Fork Charlie and West Fork Charlie units was financed from K-V funds. The K-V program will continue on a small scale on this forest as only a small percent (2%) of the area in the national forest units is in mature stands.

Intensification of pole blight damage has been noted in the Cedar-Blair (129), Willow-Lower Emerald (128), East Fork Charlie (117B), and Ramskull-Willow (116A) units. The damaged trees vary in diameter from 4 to 12 inches. An attempt will be made to salvage the damaged merchantable timber in these stands.



Blister rust control crews spent 1,005 man days on fire suppression during the month of August. All field workers were given training in fire control methods at the start of the season by ranger district personnel and BRC unit supervisors.

By Clyde J. Miller, Forester in Charge

### Kaniksu National Forest

Project personnel included Henry J. Viche, forester in charge; Quentin W. Larson, assistant project officer; Frank J. Kapel, unit supervisor; and James R. Thomson, unit supervisor.

The accomplishments of the 1957 Blister Rust Program record the largest number of acres worked since the CCC days. The production percentage figure of 0.46 man days per acre was one of the lowest in the Kaniksu's history.

A lost-time accident, occurring on July 24, brought to a sudden halt, short of the million-hour mark, an accumulation of 996,980 man hours. This unfortunate event was the first lost-time accident on the BRC operation since the 1951 season.

Trained fire suppression crews from the blister rust organization were called upon to aid in the suppression of fires in the Priest Lake Timber Protective Association and on the Bitterroot and Beaverhead National Forests.

The 1957 contracting program dropped to one-half of that of the previous year. While climatic conditions shortened the 1957 working season, the decline in contracting is primarily a result of lack of interest in this type of work on the part of prospective bidders since contract work does not make them eligible for unemployment and social security benefits.

An extensive I&E program was carried on during the past season. The operation was observed by the Secretary of Agriculture, Ezra Taft Benson; Idaho Representative Gracie Pfost; and Wolfgang Koehler, noted German Forester, who is presently attached to the German Embassy in Washington, D. C. Also, department chairmen and deans from six major forestry schools made a conducted tour during the month of July. Blister Rust Control exhibits were on display at the Bonner County Fair in Sandpoint, Idaho, during the first week in September. A news release, complete with a full page of project photographs taken on the Kaniksu's Blister Rust Control Operation, was published by the Spokane Chronicle.

A program for the treatment of damaging blister rust trunk cankers on white pine was initiated this year. Out of 20,000 potential crop trees inspected for killing cankers, 3,500 were treated with acti-dione. The dragline method used in hand eradication for ribes was adapted to the systematic examination of crop trees. Canker treatment with the new antibiotic was carried on in five different age-class areas. A total of 69 man days was required in the inspection and treatment of 59 acres. For each crop tree treated an average cost of 27 cents was expended.

The National Forest Program carried on effective work in 28 control units during the 1957 season. The 1957 K-V program in blister rust control was more extensive than in any previous year. K-V funds were used on 5,000 acres of logged over areas in nine work units and financed nearly 90 percent of the work by a 25-man crew and two truck-mounted spray rigs in the Blacktail Creek operation.



After a systematic survey, the Stony Creek drainage on the Colville National Forest, representing a fine white pine area of 4,600 acres, has been added to the present BRC program. With this addition, the Colville now has 15,000 acres under white pine management. Blister rust control on these acres is administered by the Kaniksu operation. A preliminary survey of 2,000 acres in the Rapid Lightning drainage indicated that a more intensive survey will be needed in 1958 to determine the advisability of adding this area to the present program. Timber management planning was continued in the white pine drainages of the Newport District.

Progressive rehabilitation operations are continuing in the Priest River drainage. White pine planting was accomplished on 100 acres in the Blickensderfer, Blonk Creek, Kalispell and Kalispell Bay areas. Successful control burns on 300 acres in the Blickensderfer and Reeder Creek units were first steps in area rehabilitation.

### Coeur d'Alene National Forest

Favorable weather and less drain and interruption for fire suppression resulted in a substantial increase in effective man days and accomplishments over 1956. A total of 1,287 man days were spent on fire suppression in 1956 compared to 320 this year.

Accomplishments were generally in line with preseason goals. Chemical eradication fell short of estimates due to the heavy concentrations of large mature bushes on areas selected for chemical treatment. Contract ribes eradication continued on approximately the same level as 1955 and 1956. Eleven contracts averaging 46 acres per contract were awarded.

Use of K-V funds increased over 1956. Substantial increases will be available for the next several years. There was \$13,500 available for expenditures this year, which was used for spraying heavy concentrations of ribes on cutover lands in the Clay Creek and Burnt Cabin Creek units.

Unfavorable fall weather prevented the control burning of approximately 1,000 acres of cutover lands in white pine units which had been prepared for burning. Failure to burn cutover and slashed areas on schedule generally results in increased blister rust control costs due to lighter intensity of burn the following year. Ribes germination is usually heavier and more debris is left on medium and light burns.

Of the premaintenance area (2,150 acres) worked this year, 40 percent was placed on a maintenance basis. Good progress is being made in reducing ribes populations in stabilized reproduction and pole stands to maintenance standards. Openings in advanced pole stands caused by windthrow and snow damage during the winters of 1949 to 1951 continue to be troublesome and will require some additional work for several years.

After the close of the regular season, an experiment was conducted to kill excised trunk cankers with the antibiotic acti-dione. The area selected was in a heavy infection center in a 23-year-old plantation at McGuire Saddle in the Brett Creek unit. Approximately 1,500 cankered trees were treated. Results will be observed in the spring of 1958 and information used as a guide in more extensive treatment of infected pine in 1958.



Effective September 1, William Fredeking was transferred from the blister rust control project to the Magee Ranger District.

Cecil C. George died of a heart attack on October 28, 1957. Mr. George had been a camp superintendent and unit supervisor on blister rust control on the Coeur d'Alene National Forest for many years.

By Harry J. Faulkner, Forester in Charge

### Kootenai National Forest

Twelve units presently comprise the blister rust control program on the Kootenai National Forest. Upper Star Creek and Fourth of July Creek have been dropped from future BRC planning, but the white pine pole stands in the lower South Fork of Meadow Creek unit have been re-entered into the control program. Pine stocking and disease surveys in Cherry and Burnt Creeks extended Class I and Class II white pine areas by 1,050 acres as excellent, healthy white pine stocking was found adjacent to present stands. Approximately 900 acres of this area is in Cherry Creek.

A fuller use of all eradication methods during 1957 substantially increased work accomplishments over planned objectives. Acreage worked more than tripled the goals set up in the Five Year Work Plan with only a 31 percent increase over the estimated man-day requirements. Much of the increase in acreage worked was due to use of checker-flanker work methods.

Fire suppression duties have nullified plans for late season survey work the past few years. The resultant backlog of white pine stocking and disease survey work with the large acreage needing status check coverage was greatly reduced by a special six- to eight-man survey group. It is planned to continue this work for the next two years.

Of special interest is the apparently low incidence of blister rust infection on western white pine growing in the Upper Yaak River drainage. The date of the original blister rust infection in the Yaak compares very closely with early infection dates recorded in other Inland Empire white pine areas. This date of the entrance of the rust into the area and the comparative ages of the oldest cankers seems to be the limit of similarity from a blister rust standpoint between white pine stands up the Yaak and comparable stands in Idaho. Even with a more than cursory study of the rate of spread and the buildup of the intensity of the blister rust fungus disease, it is obvious that a lower blister rust potential exists in the Yaak white pine units than in like stands elsewhere. Many unworked white pine stands and stands that had a single working back in the 1930's do not show the burned and unhealthy appearance of many white pine blocks in Idaho. Scattered flagged branches, a few "red tops" and dead trees can be seen in the Yaak areas, but the look of general widespread blister rust damage is as yet not so dramatically evident.

By Donald F. Williams, Forester in Charge

# 1. Expenditures, Calendar Year 1957

Forest	720 Funds	042 Funds	K-V Funds	Totals
Clearwater*	\$ 6,908	\$124,292	\$17,074	\$ 148,274
St. Joe*	16,686	283,426	2,359	302,471
Kaniksu*	16,320	323,000	40,527	379,829
Coeur d'Alene	19,350	140,222	13,913	173,485
Kootenai	6,172	55,863	-	62,035
Totals	\$65,418	\$926,803	\$73,873	\$1,065,094

\*Also had cooperative program on state and private lands.

# 2. Organization, 1957

Forest	Camps	Employees	Contractors
Clearwater	3	100	-
St. Joe	6	230	-
Kaniksu	10	290	12
Coeur d'Alene	6	125	7
Kootenai	2	45	-
Totals	27	790	19

# 3. Ownership in National Forest Units

Forest	National Forest Acres	Public Domain Acres	State Acres	Private Acres	Total Acres
Clearwater	166,320	1,700	3,090	7,740	178,850
St. Joe	80,200	2,700	12,100	27,300	122,300
Kaniksu	209,930*	-	4,860	24,330	239,120
Coeur d'Alene	265,500	-	4,400	10,700	280,600
Kootenai	88,850	-	-	1,260	90,110
Totals	810,800	4,400	24,450	71,330	910,980

\*15,220 acres are in the Colville National Forest.



#### 4. Total Progress on Ribes Eradication in 1957

Forest	Working	Regular	Checker	Total	Man Days	Ribes	Per Acre	
		Work Acres	Flanker Acres	Worked Acres			Man Days	Ribes
Clearwater	Initial	550	-	550	730	2,167,400	1.33	3,941
	Rework	3,080	1,400	4,480	3,200	81,360	.71	18
	Maintenance	-	390	390	250	2,360	.64	6
	Totals	3,630	1,790	5,420	4,180	2,251,120	.77	415
St. Joe	Initial	650	-	650	1,190	112,600	1.83	173
	Rework	13,540	-	13,540	9,680	192,200	.71	14
	Maintenance	130	9,740	9,870	190	2,400	.02	1
	Totals	14,320	9,740	24,060	11,060	307,200	.46	13
Kaniksu	Initial	1,970	450	2,420	2,390	283,800	.99	117
	Rework	14,250	5,410	19,660	9,110	1,029,200	.46	52
	Maintenance	3,250	2,340	5,590	1,350	24,000	.24	4
	Totals	19,470	8,200	27,670	12,850	1,337,000	.46	48
Coeur d'Alene	Initial	400	-	400	1,000	179,000	2.50	448
	Rework	3,570	1,390	4,960	4,920	144,000	.99	29
	Maintenance	290	1,260	1,550	290	3,000	.19	2
	Totals	4,260	2,650	6,910	6,210	326,000	.90	47
Kootenai	Initial	1,430	-	1,430	390	29,200	.27	20
	Rework	710	-	710	780	19,500	1.10	27
	Maintenance	-	1,890	1,890	740	9,300	.39	5
	Totals	2,140	1,890	4,030	1,910	58,000	.47	14
All Forests	Initial	5,000	450	5,450	5,700	2,772,000	1.05	509
	Rework	35,150	8,200	43,350	27,690	1,466,260	.64	50
	Maintenance	3,670	15,620	19,290	2,820	41,060	.15	2
	Totals	43,820	24,270	68,090	36,210	4,279,320	.53	63

5. K-V Work in 1957

Forest	Acres Worked	Man Days
Clearwater	590	580
St. Joe	140	240
Kaniksu	5,060	1,970
Coeur d'Alene	280	760
Kootenai	-	-
Totals	6,070	3,550

6. Chemical Eradication in 1957

Forest	Acres	Man Days	Ribes	Gallons
Clearwater	470	500	2,163,300	69,930
Kaniksu	860	1,670	1,190,800	200,500
Coeur d'Alene	400	1,010	200,000	94,610
Kootenai	210	240	28,800	16,300
Totals	1,940	3,420	3,582,900	381,340

7. Contracting in 1957

Forest	Number of Contracts	Acres	Man Days	Ribes	Dollars
Kaniksu	17	720	600	4,120	\$ 8,824
Coeur d'Alene	11	510	510	6,000	8,639
Totals	28	1,230	1,110	10,120	\$17,463

8. Acres in Control Area

Forest	Total	Age Classes by Stand Origin					
		1941- 1960	1921- 1940	1881- 1920	1841- 1880	Before 1841	Non- Forest
Clearwater	178,850	12,890	15,790	38,350	11,860	99,960	-
St. Joe	122,300	1,800	46,400	63,600	4,700	3,500	2,300
Kaniksu	239,120	13,880	60,190	94,760	12,700	57,590	-
Coeur d'Alene	280,600	8,600	61,000	41,100	17,300	152,600	-
Kootenai	90,110	420	3,040	39,300	5,560	41,790	-
Totals	910,980	37,590	186,420	277,110	52,120	355,440	2,300

9. Summary of Control Status

Forest	Total Acres	Unworked Acres	Worked Area		
			Needing Rework Acres	Needing Re-examination Acres	On Maintenance Acres
Clearwater	178,850	85,880	20,230	38,630	34,110
St. Joe	122,300	700	31,500	43,300	46,800
Kaniksu	239,120	16,500	32,300	62,880	127,440
Coeur d'Alene	280,600	86,400	51,600	95,600	47,000
Kootenai	90,110	43,010	4,510	7,590	35,000
Totals	910,980	232,490	140,140	248,000	290,350





### III. STATE AND PRIVATE PROGRAM (IDAHO)

Progress. As reported for all field units in the opening summary, the progress on the State and Private program in 1957 greatly exceeded that of many previous years. A total of 13,100 acres was worked in 1957 compared to 8,340 in 1956. Also, 3,890 acres went on maintenance as compared to 2,370 acres in 1956.

Control area adjustments. In 1954, a blister rust control area comprising 194,250 acres in the highest priority white pine units of State and Private lands was approved by the Idaho State Forester as the objective for the co-operative State and Private program. Previous control work on these units made them logical selections and a control area of this size was in line with the expected level of financing. However, logging in these units brought on areas needing ribes eradication faster than they could be handled. In view of this situation and the fact that federal financial assistance had been reduced, the Forest Service, after conference with the State Forester, assumed a part of the financing in those units having a substantial national forest acreage. Financing was arranged proportionate to the national forest acreage involved and in the records this acreage (10,160 acres on the Kaniksu and 4,996 acres on the St. Joe) was transferred to the National Forest program. Additional reduction was made on the Kaniksu principally by dropping most of the Samuels unit on Pack River, which was a low priority unit in a deferred status. Consequently, even though the present control area in the State and Private program is only 176,660 acres, essentially the same area as set up in 1954, with the exception of the Samuels unit, is being protected either in the National Forest or State and Private programs.

When work catches up with the immediate needs, it will be possible to add other areas, even though the present program was estimated for the 1950-70 period.

#### Clearwater Timber Protective Association

Three camps were established on lands of the Clearwater Timber Protective Association. One camp worked in Unit 6, Hildebrand; one in Unit 17, Reeds Creek, and Unit 18, Deer Creek; and one in Unit 20, Washington Creek.

Two truck-mounted sprayers were used in Washington Creek for respraying as well as initial coverage. Knapsack sprayers and the decapitation method were used in other areas wherever conditions warranted.

Accomplishments are practically on schedule as planned in the current five-year program. Needed rework was completed, except for small scattered patches of 1956 relogging in Reeds Creek and Deer Creek. In Hildebrand, all older cuttings in Flat Creek, Hildebrand Creek, and the majority of Orofino Creek now meet maintenance standards. In some of the younger cuttings and relog areas further work is necessary. In Washington Creek, ribes eradication is progressing north from the protection zone well into the good white pine producing area. It is now felt that the methods and techniques for spraying the older ribes plants, which predominate in this unit, are such that better progress will be made hereafter.

For the 1958 season, it is planned to operate larger crews from two camps, one at Hildebrand and one at Washington Creek. An appreciable amount of work remains



in these high priority units. The crew at Washington Creek will continue both hand and chemical eradication in as orderly a progression as is possible in view of relogging activities. The crew at Hildebrand will work in several units for which this location serves as a convenient work center.

If another unit can be added to the program in the next two or three years, the decision will be made in consultation and with the approval of the State Forester and officials of the Clearwater Timber Protective Association.

#### Potlatch Timber Protective Association

Three State and Private camps were operated during the 1957 field season. Two camps on the East Fork Potlatch drainage worked in Fry (181A), Bobs (181B), and Badger Meadows (185B) units. Hand eradication crews removed ribes from partially cut areas in the Fry-Bobs Creek area while a 25-man chemical eradication crew operating three truck-mounted power sprayers covered a protection zone adjacent to the clear-cut areas in Experimental Draw in the Badger Meadow unit. The third camp operated in the Cameron (188A), Shattuck-Squaw (188B), and Bull Run (190) units near Elk River. Work in these units involved widely scattered areas having few ribes.

During September a crew from Potlatch Forests, Inc., began planting white pine on the 111 acres of clear-cut area in Experimental Draw, East Fork Potlatch drainage. This work will be completed during the spring and fall of 1958.

A change in financing blister rust control was made for the Bull Run, Elk Creek, and Lone Meadow units, which are in the State and Private program. According to land ownership, the work in these units will be financed with 60 percent State, private, and federal cooperative funds and 40 percent federal funds allotted for work on national forest lands. Under this financial plan, the 4,996 acres of national forest involved were transferred from the State and Private program to the National Forest program.

A disease survey was made on 1,086 acres of white pine reproduction in the partially cut Fry Creek unit. The survey indicated that 9.2 percent of the young white pine had damaging cankers. This degree of infection is not considered serious at present because of the sufficient stocking of white pine reproduction.

#### Priest Lake Timber Protective Association

During the 1957 season blister rust control work was carried on in eight separate State and Private units.

A 30-man camp in Ruby Creek devoted the entire summer in cleaning up the Ruby and Trapper Creek units. The Snow Creek drainage, containing 1,000 acres and lying contiguous to the Ruby Creek unit at its northwest boundary, was brought into the unit. As a result of the summer's work in these two units, approximately 80 percent of their combined area is now on maintenance.

A camp on Jeru Creek worked in the Hellroaring and French Creek units. The presently planned work in Hellroaring Creek has now been completed.



A five-man truck-mounted power spray unit operated in the Middle Fork of East River area. This operation chemically treated 45 acres of heavy ribes concentrations along roads and streams.

Ninety man days were expended in status checking 5,000 acres. Sufficient status checking of the planned 1958 work areas in the Caribou and Trail Creek units was completed. The Caribou campsite will be situated on the shore of Mosquito Bay at the north end of Priest Lake while the Trail Creek camp will be at the Shiloh Guard Station.

A 50-acre contract area in the Bear Creek unit containing a moderate to heavy number of ribes per acre was completed and checked during the latter part of the summer.

### 1. Expenditures, Calendar Year 1957

Timber Protective Association	Federal Funds			State and Private Funds			Total
	720	411	Total	State	Private	Total	All Funds
Clearwater	\$ 5,212	\$ 48,470	\$ 53,682	\$27,457	\$10,677	\$38,134	\$ 91,816
Potlatch (St. Joe)	4,172	39,194	43,366	40,071	8,411	48,482	91,848
Priest Lake (Kaniksu)	2,000	10,592	12,592	14,792	6,292	21,084	33,676
Totals	\$11,384	\$ 98,256	\$109,640	\$82,320	\$25,380	\$107,700	\$217,340

720 - leadership funds

411 - cooperative control funds

### 2. Field Organization, 1957

Area	Camps	Employees	Contractors
Clearwater T.P.A.	3	100	-
Potlatch T.P.A. (St. Joe)	3	100	-
Priest Lake T.P.A. (Kaniksu)	1	30	3
Totals	7	230	3

### 3. Ownership in State and Private Units

Area	State Acres	Private Acres	Public Domain Acres	National Forest Acres	Total Acres
Clearwater T.P.A.	15,440	51,140	-	3,380	69,960
Potlatch T.P.A. (St. Joe)	17,300	37,300	2,500	5,100	62,200
Priest Lake T.P.A. (Kaniksu)	29,520	3,740	-	3,420	36,680
Other State & Private (Kaniksu)	690	3,500	-	3,630	7,820
Totals	62,950	95,680	2,500	15,530	176,660

#### 4. Total Progress on Ribes Eradication in 1957

Area	Working	Regular		Checker		Total		Per Acre	
		Acres	Acres	Worked	Man Days	Acres	Ribes	Man Days	Ribes
Clearwater T.P.A.	Initial	120	-	120	280		354,300	2.33	2,953
	Rework	1,850	-	1,850	1,790		117,030	.97	63
	Maintenance	810	600	1,410	1,200		6,640	.85	5
	Totals	2,780	600	3,380	3,270		477,970	.97	141
Potlatch T.P.A. (St. Joe)	Initial	530	-	530	860		589,500	1.62	1,112
	Rework	3,570	-	3,570	3,150		141,600	.88	40
	Maintenance	10	3,190	3,200	60		1,200	.02	1
	Totals	4,110	3,190	7,300	4,070		732,300	.56	100
Priest Lake T.P.A. (Kaniksu)	Initial	320	230	550	230		3,000	.42	5
	Rework	1,410	460	1,870	1,120		22,000	.60	12
	Totals	1,730	690	2,420	1,350		25,000	.56	10
All Areas	Initial	970	230	1,200	1,370		946,800	1.14	789
	Rework	6,830	460	7,290	6,060		280,630	.83	38
	Maintenance	820	3,790	4,610	1,260		7,840	.27	2
	Totals	8,620	4,480	13,100	8,690		1,235,270	.66	94

#### 5. Chemical Eradication in 1957

Area	Acres	Man Days	Ribes	Gallons
Clearwater T.P.A.	240	550	434,270	65,490
Potlatch T.P.A. (St. Joe)	290	550	553,600	55,360
Priest Lake T.P.A. (Kaniksu)	40	60	11,000	9,500
Totals	570	1,160	998,870	130,350

#### 6. Contract Ribes Eradication in 1957

Area	Number of Contracts	Acres	Man Days	Ribes	Dollars
Priest Lake T.P.A. (Kaniksu)	1	50	60	1,330	\$808



## 7. Acres in Control Area

Area	Total	Age Classes by Stand Origin					
		1941- 1960	1921- 1940	1881- 1920	1841- 1880	Before 1841	Non- Forest
Clearwater T.P.A.	69,960	17,490	28,190	5,200	3,050	16,030	-
Potlatch T.P.A. (St. Joe)	62,200	12,000	15,800	21,500	2,400	9,800	700
Priest Lake T.P.A. (Kaniksu)	44,500	1,040	12,680	19,150	1,110	10,520	-
Totals	176,660	30,530	56,670	45,850	6,560	36,350	700

## 8. Summary of Control Status

Area	Total Acres	Unworked Acres	Worked Area		
			Needing Rework Acres	Needing Re-examination Acres	On Maintenance Acres
Clearwater T.P.A.	69,960	21,440	10,060	16,800	21,660
Potlatch T.P.A. (St. Joe)	62,200	8,900	19,100	15,000	19,200
Priest Lake T.P.A. (Kaniksu)	44,500	4,240	6,760	12,380	21,120
Totals	176,660	34,580	35,920	44,180	61,980





#### IV. NATIONAL PARK PROGRAM

The 1957 National Park Service Region II white pine blister rust control program was continued for the 19th consecutive year under cooperative arrangements between the National Park Service and the U. S. Forest Service. The Forest Service furnishes leadership, coordination, and technical direction of the projects and certain operational services as requested.

##### Personnel Participating

Glacier	Gordon Bender, Chief Ranger A. D. Cannavina, Supervisory Park Ranger, in charge R. Grimm, District Ranger
Yellowstone	Otto Brown, Chief Ranger H. O. Edwards, Supervisory Park Ranger, in charge
Rocky Mountain	Harry Daring, Chief Ranger Wayne B. Cone, District Ranger, in charge
Grand Teton	Ernest K. Field, Chief Ranger Stanley E. Broman, District Ranger, in charge Maynard Barrows, NPS Consulting Forester
U. S. Forest Service, Region One	John C. Gynn, Forester, in charge C. M. Chapman, Forester

Objectives. The 1957 program carried forward scheduled rework and maintenance work on the original control areas and started ribes eradication where infection is most imminent in the recent area additions. In the latter case, this involved initial work in heavy ribes concentrations in difficult areas and constituted 35 percent of the total acres worked in 1957.

The objectives were achieved or exceeded in all parks except Yellowstone, where an Asiatic flu epidemic in early August caused over 30 men to leave the job for recovery at home.

New area approved for control at Rocky Mountain. The 4,050-acre white pine (*Pinus flexilis*) Windy Gulch-Hidden Valley area surveyed in 1955 and 1956 was approved as a control unit by the National Park Service. The area includes the new Hidden Valley ski development center and is transected by the Trail Ridge road.

Control work started in Grand Teton. Ribes eradication was started in 1957 on Deadman's Bar vista point control area because of the proximity of pine infection found in 1956. Since over half of the unit was covered in 1957, initial work can be completed in 1958. Necessary rework if advisable can be started in 1959, one year ahead of schedule.

Large increase in use of chemical methods. Of the area worked in 1957, 24.5 percent was treated by chemical methods, 20 percent by power and 4.5 percent by hand equipment. Power spraying covered nearly three times more acres than in 1956. Power spraying time was also reduced almost a half man day per acre.



Eight portable power sprayers and 17 Hi-Fog spray guns were used. Additional emulsion oil was used in all chemical spray formulations to increase their effectiveness.

New multi-purpose work center pays off at Glacier. A small portable camp for use by blister rust and trail crews was constructed at the Two Medicine Ranger Station. Housing facilities were adequate for local crews and weekend use by the men from the Oldman Lake batching pack camp. This comfortable camp was a major factor in the high morale of the men. No voluntary personnel turnover occurred during the entire season. Ribes eradication time was reduced .27 man day per acre below 1956.

Checking and surveys. To secure essential information for planning future work, ribes status checks were made on 4,620 acres in the unworked, worked, and maintenance categories. Also, disease surveys were made on 340 acres in Glacier.

Summary of control status. From current year accomplishments 1,570 acres were advanced to the maintenance classification. Although nearly all areas treated in 1957 were brought to zero ribes according to the efficiency checks, they were not classified on maintenance because the number of ribes and ribes seedlings removed indicate additional work might be required on some portions. Of the total worked area, 73 percent is now in the maintenance category.

#### 1. Expenditures, Calendar Year 1957

National Park	National Park BRC	Forest Service	
		Leadership and Technical Direction	Totals
Glacier	\$ 20,099	\$2,824	\$ 22,923
Yellowstone	69,804	4,706	74,510
Grand Teton	7,138	471	7,609
Rocky Mountain	13,354	1,412	14,766
Totals	\$110,395	\$9,413	\$119,808

#### 2. Field Organization, 1957

National Park	Camps	Employees
Glacier	2	13
Yellowstone	3	62
Grand Teton	1	5
Rocky Mountain	1	10
Totals	7	90

### 3. Total Progress on Ribes Eradication in 1957

National Park	Working	Regular	Checker	Total	Man	Ribes	Per Acre	
		Work	Flanker	Worked			Man	Ribes
		Acres	Acres	Acres	Days		Days	
Glacier	Initial	140	-	140	170	247,800	1.21	1,770
	Rework	400	250	650	470	18,900	.72	29
	Maintenance	80	40	120	40	1,300	.33	11
	Totals	620	290	910	680	268,000	.75	295
Yellowstone	Initial	780	-	780	1,320	295,400	1.69	379
	Rework	1,170	810	1,980	1,210	76,700	.61	39
	Maintenance	-	380	380	40	600	.11	2
	Totals	1,950	1,190	3,140	2,570	372,700	.82	119
Grand Teton	Initial	390	230	620	280	130,700	.45	211
Rocky Mountain	Initial	490	-	490	250	5,000	.51	10
	Rework	260	340	600	310	7,900	.52	13
	Maintenance	30	-	30	10	300	.33	10
	Totals	780	340	1,120	570	13,200	.51	12
All Parks	Initial	1,800	230	2,030	2,020	678,900	1.00	334
	Rework	1,830	1,400	3,230	1,990	103,500	.62	32
	Maintenance	110	420	530	90	2,200	.17	4
	Totals	3,740	2,050	5,790	4,100	784,600	.71	136

### 4. Chemical Ribes Eradication in 1957

National Park	Acres	Man Days	Ribes	Gallons
Glacier	120	160	247,500	3,810
Yellowstone	880	1,450	292,200	37,840
Grand Teton	160	200	110,500	4,100
Rocky Mountain	260	210	7,300	2,240
Totals	1,420	2,020	657,500	47,990



## 5. Summary of Control Status

National Park	Total Acres	Unworked Acres	Needing Rework Acres	Worked Area	
				Needing Re-examination Acres	On Maintenance Acres
Glacier	6,010	620	820	870	3,700
Yellowstone	33,290	19,420	2,730	1,870	9,270
Grand Teton	1,010	390	-	290	330
Rocky Mountain	12,650*	4,500	480	450	7,220
Totals	52,960	24,930	4,030	3,480	20,520

\*Includes 4,050 additional acres approved in 1957.

Recommendations for National Park Service Program in Calendar Year 1958. The recommended field programs below coincide with the "Region II - Blister Rust Program - Fiscal Years 1958 Through 1963" as revised in agreement with National Park Service officials in Omaha, Nebraska, February 1, 1957. Additional men should be hired at the start of the season to compensate for man-day losses caused by late arrivals, quits, fire suppression, and employees leaving early. Recommendations are based on a six-day work week for a complete three-month working season.

Area	GS-6 Camp Superintendent	GS-5 Checker	Working Leadmen	Laborers	Total
<u>Glacier</u>					
Park Headquarters	1*	1*	2	6	10
Lake McDonald	-	-	2	6	8
Totals	1	1	4	12	18
<u>Yellowstone</u>					
Antelope Creek	-	-	3	12	15
Canyon	2**	1	7	32	42
Mt. Washburn Extension	1	1	4	20	26
Totals	3	2	14	64	83
<u>Grand Teton</u>					
Snake River	1	-	-	4	5
<u>Rocky Mountain</u>					
Boulder Brook and maintenance control	1	1	2	6	10
Total All Parks	6	4	20	86	116

\*Serves both camps

\*\*Includes unit supervisor



## V. SCOUTING FOR WHITE PINE BLISTER RUST, 1957

Scouting for white pine blister rust (Cronartium ribicola) was performed in Montana, Wyoming, northern Colorado, northeastern Utah, and southeastern Idaho. Inspections were made in 50 drainages on 8 national forests and 3 national parks. Examinations were made on 9,670 white pine (Pinus albicaulis and P. flexilis) and on 13,900 ribes of various species.

Except in the Bridger National Forest, blister rust infection has been found previously in the national forests and national parks listed below in Montana, and Wyoming. However, inspections made in 1957 at other locations in these forests and parks as well as those made in Colorado, Utah, and Idaho revealed no new blister rust infection centers. A considerable buildup was noted in most of the outlying centers previously reported. This is particularly true in the unprotected areas of Montana and the north half of Wyoming.

### Scouting Summary, 1957

Location	Drainages Scouted	Ribes Examined	Pine Examined
<u>Montana</u>			
Gallatin N. F.	1	150	100
<u>Wyoming</u>			
Yellowstone N. P.	10	1,200	4,090
Teton N. F.	2	300	580
*Bridger N. F.	6	990	-
Grand Teton N. P.	3	1,550	2,080
Medicine Bow N. F.	6	1,380	920
<u>Colorado</u>			
*Roosevelt N. F.	5	1,290	..
Rocky Mountain N. P.	8	1,780	160
<u>Utah</u>			
*Wasatch N. F.	4	2,510	240
*Cache N. F.	2	950	550
<u>Idaho</u>			
*Caribou N. F.	3	1,800	950
Totals	50	13,900	9,670

\*Pinon rust found. Denotes conditions are also favorable for white pine blister rust.





Highlights of 1957 Work

1. The acetic acid of 2,4,5-T is more effective in ribes eradication in some cases than the propionic acid of 2,4,5-TP and costs half as much. Both substances are highly effective on Ribes coloradense.
2. Effective eradication of R. viscosissimum is accomplished by spraying two years after slash disposal in heavy partial cuttings. To reduce blister rust infection in white pine seedlings following heavy partial cuttings, it is advisable to spray two years after slash disposal when the ribes population is principally R. viscosissimum. Where R. lacustre is plentiful, spraying before the third year following slash disposal would not, in most cases, accomplish much because of the slower rate of R. lacustre seed germination. White pine seedlings are moderately to highly resistant to 2,4,5-T spray while grand fir is quite susceptible.
3. Ribes lacustre one-year-old resprouts are killed by basal stem treatment with a Hi-Fog gun, using a 2.5 percent acid equivalent weight of 2,4,5-T in stove oil.
4. Effectiveness of late season spraying is increased by the nozzle prong. Nozzles with prongs to scarify the root crown of dormant plants resulted in killing 5 to 8 percent more ribes than nozzles without prongs. Also, 2,4,5-T is more effective in late season on dormant ribes than 2,4,5-TP.
5. Spruce and white pine seedling mortality from spray applied to ribes is not serious. When ribes were sprayed two years after heavy salvage cutting in a beetle-killed stand of spruce, one-year-old Engelmann spruce seedling mortality from spray was 4 percent; western white pine, 15 percent; alpine fir, 72 percent; and western larch, 77 percent. Spruce and white pine injury was largely confined to germinating seeds whose radicle lay on top the soil surface exposed to spray. Spray mortality to two-year-old seedlings was alpine fir, 13 percent; western larch, 70 percent; and no injury to spruce and white pine. Certain precautionary measures are advisable to minimize seedling mortality from spray. Insofar as practicable spray should be selectively applied to ribes. Mineral soil surface on which spruce and white pine seedlings are germinating should not be sprayed promiscuously. Examine such ground and if ribes seedlings are present spray them individually or confine spray to the actual area occupied by ribes.
6. Trunk cankers were killed with an Acti-dione and stove oil mixture. A 3.84 percent concentrate of Acti-dione BR specifically formulated in an oil soluble organic solvent for dilution to 150 ppm in stove oil was used to treat trunk cankers. Spray was first applied to the bark surface of a trunk canker to bring out the area of discoloration. Dead bark was excised to expose woodrotting fungi and destroy bark beetle infestations. Slits the length of a hatchet blade were spaced about 3 inches apart and centered on the margin of discoloration with slits that occur at the upper and lower ends and at the outer edges of a canker. Treatment was completed by wetting the trunk canker with the Acti-dione BR stove oil mixture applied by mist-type sprayer.



## Results of Ribes Chemical Eradication Studies

1. 2,4,5-T and 2,4,5-TP tests on mature R. lacustre. Bramblcide, isooctyl ester 2,4,5-trichlorophenoxyacetic acid, and Kuron, propylene glycol butyl ether ester 2,4,5-trichlorophenoxypropionic acid, were applied separately and in combination as aqueous foliage spray to 15-year-old R. lacustre growing along roadbanks with root crowns buried under logs and roadside berm and in stream bottoms. Plots one-fifth acre in size were sprayed by portable power sprayer, August 7 and 8, 1956, South Fork Granite Creek, Kaniksu National Forest.

Separately and in combination, the acetic and propionic acids of 2,4,5-T were about equally effective on hard-to-kill R. lacustre plants.

Plot	Chemical	Ppm	R. lacustre plants	
			Total No.	Percent killed
1	2,4,5-T	2,000	65	97
2	2,4,5-T	1,500	56	99
	2,4,5-TP	500		
3	2,4,5-T	1,000	47	98
	2,4,5-TP	1,000		
4	2,4,5-T	500	51	96
	2,4,5-TP	1,500		
5	2,4,5-TP	2,000	59	98

2. 2,4,5-T and 2,4,5-TP tests on mixed ages of R. coloradense and R. lacustre. Bramblcide, isooctyl ester 2,4,5-trichlorophenoxyacetic acid, and Kuron, propylene glycol butyl ether ester 2,4,5-trichlorophenoxypropionic acid, were applied separately and in combination as aqueous foliage spray to mixed ages of R. coloradense and R. lacustre in recent cutover beetle-killed spruce. Plots one-tenth acre in size were sprayed by portable power sprayer, August 18, 1956, Keeler Creek, Kootenai National Forest.

At about half the cost for proprietary material, acetic acid exceeded or equalled propionic acid and the combination spray in killing mixed ages of actively growing R. coloradense and R. lacustre. R. coloradense plants proved extremely susceptible to these sprays.

Plot	Chemical	Ppm	R. coloradense		R. lacustre	
			Total No.	Percent killed	Total No.	Percent killed
1	2,4,5-T	1,500	47	100	53	100
2	2,4,5-T	750	81	100	37	95
	2,4,5-TP	750				
3	2,4,5-TP	1,500	113	100	43	98

### 3. Spraying ribes two years after slash disposal in heavy partial cuttings.

Area location - Orofino Creek, Clearwater National Forest.

Cutting method - heavy partial cutting leaving seed trees.

Slash disposal - dozer piled and burned in 1954.

Ribes species - R. viscosissimum.

Plot 1 - ribes seedlings hand pulled.

Plot 2 - broadcast sprayed 1956 with butoxyethanol ester 2,4,5-T.

Plot 3 - broadcast sprayed 1956 with isooctyl ester 2,4,5-T.

Ribes were satisfactorily destroyed by spraying without serious injury to white pine seedlings. High mortality occurred to grand fir reproduction. Hand pulling destroyed 98 percent of the ribes.

Spraying earlier than the third year following slash disposal to reduce the period ribes are in association with white pine seedlings is not advised unless the ribes population is composed principally of R. viscosissimum, a species that normally completes germination in 2 years after slash disposal in heavy partial cuttings.

Plot	Treatment	Ppm	Number seedlings germinating following slash disposal			Total No.	Eradicated percent
			1	2	3		
1	hand pulled		1,374*	19	0	1,393	98
2	butoxyethanol ester 2,4,5-T	1,500	seedling population assumed same as number hand pulled				100
3	isooctyl ester 2,4,5-T	1,500	seedling population assumed same as number hand pulled				100

\*Includes 3 R. lacustre seedlings

4. Basal stem treatment of R. lacustre resprouts by Hi-Fog gun. Bramblicide, isooctyl ester 2,4,5-T, and Kuron, propylene glycol butyl ether ester 2,4,5-T, mixed to make 2.5 percent solutions (6 fluid ounces of herbicide to 1 gallon stove oil) were applied to 50 R. lacustre one-year-old resprouts by Hi-Fog gun, September 5, 1956, Solo Creek, Kaniksu National Forest. A 100 percent kill was accomplished.

Chemical	Number Resprouts	Percent Killed
isooctyl ester 2,4,5-T	50	100
propylene glycol butyl ether ester 2,4,5-TP	50	100



5. Testing prong attachment to nozzle for spraying ribes in late season. In Potter Creek, Coeur d'Alene National Forest, 7 one-tenth-acre plots were sprayed with a portable power unit to compare the effectiveness of chemical formulations applied with and without prongs attached to the Pecan Gun nozzle. An aqueous spray containing 10 percent stove oil was applied to wet winter buds and stems and generously drench crowns of the dormant *R. lacustre*. Scarification of a crown was accomplished by jabbing it 2 to 5 times with the nozzle prong and applying spray simultaneously. The effectiveness of 2,4,5-T late season spraying was increased by 5 to 8 percent in scarifying crowns with the nozzle prong attachment.

Chemical (2,000 ppm)	Nozzle with Prong Attachment		Nozzle without Prong Attachment	
	Total Ribes	Percent Killed	Total Ribes	Percent Killed
Monsanto, isooctyl ester 2,4,5-T	51	98	61	90
Thompson, isooctyl ester 2,4,5-T	47	100	59	93
Dow, propylene glycol butyl ether ester 2,4,5-TP	57	92	65	87

6. Chemical injury to coniferous seedlings from spray applied to ribes. *Ribes lacustre* of mixed ages on spruce salvage cuttings in Fairway Creek, Kootenai National Forest were sprayed by blister rust crew in 1956. An aqueous solution of the isooctyl ester 2,4,5-T (1,800 ppm a.e.) was applied broadcast at a volume of 350 to 400 gallons per acre over all low-growing vegetation to wet seedling ribes. Large and all mature plants were selectively treated by drenching crowns and wetting foliage with spray. Milacre plots were established throughout the cutover area to record species, age, and number of conifer seedlings before and one year after spraying.

Comparing percent of seedling survival on sprayed and unsprayed milacre plots indicates the following mortality in one-year-old seedlings caused by spray: Engelmann spruce, 4 percent; western white pine, 15 percent; alpine fir, 72 percent; and western larch, 77 percent. Mortality from spray in spruce and white pine was largely confined to newly germinated seeds whose radicle still lay exposed on the soil surface.

In the case of two-year-old seedlings, results showed no injury to spruce and white pine while mortality was 13 percent for alpine fir and 70 percent for western larch.

While no serious chemical injury was found on two-year-old spruce and white pine seedlings, the spraying of these seedlings should be avoided when possible by treating intermingled ribes selectively.



Average Number Seedlings Per Milacre Plot Before  
And One Year After Spraying and Percent Survival

Tree Species	Sdlg. Age Years	Sprayed Area			Unsprayed Area		
		Number of Sdls.		Surv.	Number of Sdls.		Surv.
		Before	After	%	Before	After	%
Engelmann Spruce	1	71	45	63	49	33	67
	2	10	10	100	2	2	100
	Av.	81	55	69	51	35	69
Western White Pine	1	13	7	54	13	9	69
	2	1	1	100	3	3	100
	Av.	14	8	57	16	12	75
Alpine Fir	1	11	2	18	3	3	100
	2	3	2	67	5	4	80
	Av.	14	4	28	8	7	87
Western Larch	1	22	1	5	17	14	82
	2	10	3	30	7	7	100
	Av.	32	4	12	24	21	87

Before spraying - milacre plots established July 19, 1956.

After spraying - milacre plots examined August 7, 1957.

### Developments in Treating Infected White Pine

#### A. Results of 1956 Treatments

1. Acti-dione. Trunk cankers were killed by the excise, slit, and injection methods. In the excise method, bark was cut from around the canker to expose the mycelium to Acti-dione treatment. On the upper side bark was removed about 2 inches beyond discoloration and on the lateral and lower sides to the edge of discoloration.

The slit and injection methods were used to treat trees of small diameter. In the slit method, a single slit was cut in the bark longitudinally through the canker into which Acti-dione was sprayed. In the injection method, Acti-dione was injected into the bark on the upper (distal) end of the canker with a hypodermic syringe.

In all methods of treatment, Acti-dione was more effective mixed in stove oil than in Sovaspray 100 or in a 2 percent glycerol aqueous solution. The stove oil and glycerol aqueous solutions were prepared by dissolving crystalline Acti-dione in acetone and adding the solute to the spray solution.

2. Mycostatin and PVP-Iodine. These substances were not effective on trunk cankers treated by the excise and slit methods.

#### B. Progress in 1957

1. Cooperation with the Upjohn Company. Work in the development and improvement of Acti-dione formulations was jointly undertaken with Dr. William



Klomprens, director, and Dr. G. A. Boyack, chemist, Agricultural Research and Development Division, The Upjohn Company, Kalamazoo, Michigan. They visited field work on the Kaniksu, June 10 to 14. Again on September 4 to 10, Dr. Klomprens accompanied by Mr. R. C. Bryce, director of chemical sales, visited the Kaniksu to examine tests made during the summer months.

2. Acti-dione formulations tested. Acti-dione formulations evaluated in the treatment of infected white pine included Acti-dione AA, Acti-dione T, Acti-dione 0.6 percent, Acti-dione 2.4 percent, semicarbazone 3.0 percent, and the derivatives of cycloheximide; oxime, acetate, and semicarbazone. Tests were made at concentrations of 50, 100, and 200 ppm.

3. Other antifungal antibiotics tested. These included Oligomycin, Anisomycin, Griseofulvin, Compound RA, Rimocidin, and Agrimycin.

4. Studies in methods of application. The antifungal substances were applied through foliage, soil drench, and trunk cankers. Foliage of infected white pine was wet to the point of dripping with aqueous and oil emulsion sprays. The same formulations were applied to drench soil generously about the crowns of infected trees. In the treatment of trunk cankers, the antifungal substances were mixed in stove oil and applied in spray to (1) intact cankers, (2) excised cankers, (3) cankers slit about the margin of discoloration, (4) several horizontal slits in the bark of trunks at breast height to kill infection in the upper crown portion of trees, and (5) the distal end of cankers by injecting solution into bark with a hypodermic syringe.

5. Practical field tests with Acti-dione. Forty-eight bottles (4 fluid ounces each) of a 3.84 percent concentrate of Acti-dione BR specifically formulated in an oil soluble organic solvent for the treatment of blister rust trunk cankers were supplied by The Upjohn Company without cost to the Forest Service for experimental work in treating infected white pine. The 4-fluid-ounce bottles of Acti-dione BR concentrate were distributed for field work as follows: Clearwater, 12; St. Joe, 2; Coeur d'Alene, 6; Kaniksu, 20; Kootenai, 4; and D&I project, 4. Four fluid ounces when diluted with stove oil make 8 gallons of 150 ppm Acti-dione BR spray.

Personnel on each forest were trained during August and September in the following procedures for treating trunk cankers:

a. Applying a light film of the 150 ppm Acti-dione stove oil mixture to the trunk canker to outline distinctly the margin of discoloration.

b. Excising dead bark to expose wood-rotting fungi and destroy bark beetle infestations.

c. Making slits in the bark the length of a hatchet blade about 3 inches apart and centered on the margin of discoloration. Single slits should be made at the upper, lower, and two outer edges of the canker.

d. Wetting the cut surface of the trunk canker with the 150 ppm Acti-dione BR stove oil mixture using a mist-type sprayer.

6. Publications. Results of a preliminary study on trunk canker treatment were reported in an article entitled "Acti-dione Treatment of Blister

Rust Trunk Cankers on Western White Pine," published in the Plant Disease Reporter 41: 709-714, August 15, 1957.

By Virgil D. Moss, Forester (Silviculture)





## VII. DEVELOPMENT OF RUST RESISTANT WHITE PINE, 1957

### New Genetics Work Center Being Established

The Forest Service is establishing a North Idaho Forest Genetics Center at Moscow, Idaho, in cooperation with the University of Idaho. The University, recognizing the importance of developing rust resistant white pine for planting, has given the Forest Service long-term use of University lands, including a 2-acre building site near the campus and a 40-acre arboretum site on nearby farmlands for conducting genetics work on white pine and also on other tree species. At the building site the Forest Service has established an experimental nursery and has done the site preparation work preliminary to building construction. Construction is planned for early 1958. On the 40-acre area the Forest Service has put in a 25-acre sprinkler irrigation system and has planted 15 acres with special seedlings recovered from the first generation progeny tests. These seedlings are the foundation stock toward second generation and backcross breeding. Under cultivation, watering, and fertilizing, they should commence flowering in 5 to 15 years. Other experiments in flower induction will soon be undertaken.

### Mass Production of The Most Promising First Generation Progenies

Mass production of the most highly resistant first generation progenies as mentioned in the 1955 and 1956 reports is continuing. To date several first generation progenies contain up to 30 to 40 percent of individuals which survived the artificial inoculations. It is proposed that these progenies be mass produced by pollinating entire trees with a few selected pollens then tested in pilot-scale plantings. These field plantings are important because (1) they will help determine under natural field conditions the level of resistance of materials chosen for their relatively high resistance under intense artificial inoculations and (2) they will show whether first generation seedlings will be useful for meeting planting needs in the near future. Sufficient numbers of seedlings of the promising first generation progenies will be produced to make at least three pilot-scale plantings.

### Controlled Pollination And Progeny Test Work Continued

Over 800 pollination bags were used in the 1957 controlled pollinations. Included were 23 intraspecies crosses with heretofore untested parents found in 1956 selection work, 5 interspecific crosses with sugar pine as the pollen parent, 6 intraspecies crosses for mass production of promising first generation progenies, and numerous crosses with self and mixed pollens used in a 310-bag selective fertilization experiment.

A replicated, 67-progeny test was sown at the new Moscow nursery, comprised entirely of wind-pollinated seed of 67 new selections. All old lots of controlled pollinated seed from previous years were also sown at the new nursery to provide genetically uniform rootstocks and seedling materials for forthcoming grafting work and fertilizer trials. Altogether, 240 running feet of experimental nursery beds were sown.



## Selection of Highly Resistant Individual Plants Toward Second Generation Breeding

Highly resistant first generation seedlings from among the 92 progenies comprising the oldest progeny tests (from 1950 controlled pollinations) were selected and transplanted to the new Moscow arboretum in the late fall of 1957. These were classified as "A", "B", "C", or "D" seedlings, depending on individual performance following artificial inoculation. Class "A" seedlings showed no foliage or bark infection, while seedlings immediately adjacent at inoculation time all became infected. Class "B" seedlings also showed no foliage or bark infections but were found occurring in less heavily infected portions of the nursery beds. Class "C" seedlings supported one or more needle-spot infections yet failed to develop typical bark cankers. Class "D" seedlings supported one or more typical bark cankers subsequently inactivated by cork formation in the bark of the host. Actually, only tentative selections are made at first and the plants thus selected are reinoculated to eliminate "escapes".

The results of reinoculation of a group of Class "A" and "B" seedlings are of interest and are shown below:

Results from October 1957 Inspections of Tentative Class "A" and "B" Seedlings  
After Reinoculation in September 1955

Seedling Class	Number Plants	Rust-free Plants Number	Plants Percent	Number of Cankers Per Plant	Number of Cankers Per Infected Plant
A	106	55	52	1.6	3.4
B	243	86	37	1.9	3.5
Controls <sup>1/</sup>	47	0	0	7.6	7.6

<sup>1/</sup> Run-of-the-mill, potted nursery seedlings chosen for similarity in size and amount of foliage to the average Class "A" or "B" seedling.

Points that emerge from examination of the foregoing table are (1) tentatively inoculated materials must be reinoculated to eliminate "escapes", (2) selection for rust resistance is realistic and lucrative, (3) there is little real difference between Class "A" and Class "B" plants, and (4) resistance of 2-year-old materials continues to be shown by 4- to 6-year-old materials.

### Heritability of Rust Resistance in Western White Pine Is High

With materials from the original 92-progeny test nearing the completion of the 10-year-long testing process, the first reliable data for computation of heritability of rust resistance are being rounded out. Table 1 shows the percentages of highly resistant (i.e., Class "A", "B", "C", and "D") seedlings surviving the artificial inoculation test process. Analysis shows that both parents have a significant effect on the resistance of a given progeny and a glance across or down the rows or columns representing various parents will show this effect. Certain parents, used as seed or pollen parents in a cross, have a consistent effect on the relative resistance of their progenies, and in the case of parents like numbers 17, 19, 22, or 58, the separate effects



Table 1. Observed Percentages of Highly Resistant (Class "A", "B", "C", & "D") Seedlings Recovered Among Artificially Inoculated F<sub>1</sub> Progenies of 24 Blister Rust Resistant Parents 1/

[illegible]

1/ Percentages shown are as observed in field, less 5% (the average percentage of nonresistant control plants also remaining healthy).

2/ Asterisk indicates percentage is based on 12-28 (av. 19) seedlings; otherwise on 35-90 (av. 84) seedlings.



of both parents are additive (i.e., the progeny 17 x 19, containing 31 percent of highly resistant seedlings is better than the average progeny of either parent). Following adjustment of the data for significant effect of opposite parent involved in each progeny of a given parent, the genetic differences between the parents become clearer. The heritability (H) of resistance can be calculated as a measure of the strength of apparent parental relationships using the formula

$$H = \frac{V_g}{V_g + V_e} \text{ where}$$

$V_g$  equals genetic variance or a value expressing the consistency of the difference in resistance between progenies of different parents and  $V_e$  equals environmental variance or a value expressing the various effects of environment as shown by the difference between progenies of the same parents. Under conditions of this experiment heritability is high, nearly 85 percent, indicating that the genetic traits of the parents are accounting for approximately 85 percent of the variation in resistance seen in the first generation progenies. This indicates that selection of rust resistant parents and seedlings is probably a fairly lucrative approach for improvement of rust resistance in western white pine and that improvement in rust resistance following selection for resistant seedlings in each successive generation will be large.

By Richard T. Bingham, Forester (Silviculture)

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

Region 5

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ANNUAL REPORT

ON

THE CONTROL OF WHITE PINE BLISTER RUST

IN CALIFORNIA

FOR THE CALENDAR YEAR 1957



U. S. DEPARTMENT OF AGRICULTURE  
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# THE BLISTER RUST CONTROL PROGRAM - 1957

By

Neil J. MacGregor, BRC Officer

White pine blister rust, a fungus-caused disease which was introduced into North America from Europe about 1900, is now widespread throughout Northern California and is epidemic on thousands of acres in the northwest portion of the State. The disease fatally attacks California's white pines and seriously threatens the continued production of sugar pine, one of the State's most valuable timber species. Endangered white pines other than sugar pine are western white pine, whitebark pine, limber pine, foxtail pine, and bristlecone pine. These species are of value principally for recreational, aesthetic, and scientific purposes. Control of blister rust is accomplished through the eradication of wild gooseberry and currant bushes (ribes), which act as alternate hosts for the parasitic disease.

Cooperation between Federal and State agencies and private industry is the keynote of the blister rust control program in California. The U. S. Forest Service furnishes over-all leadership, technical direction, and coordination to the entire program and conducts control projects on land under its jurisdiction. The Forest Service and the State of California cooperatively conduct control programs on lands of private owners engaged in sugar pine management. Control programs are in progress on National and State Parks and on commercial forests administered by the California Division of Forestry.

The financing available for control work in fiscal year 1958 is given in the following table:

BLISTER RUST CONTROL FINANCING  
FISCAL YEAR 1958

State of California	Private Owners	Federal Allotments				Total
		State and Private Lands	National Forest Lands	National Park Lands	Technical Direction	
\$115,000	\$6,833	\$58,000	\$266,000	\$148,005	\$89,000	\$682,838

The encouragement and strong financial support of the State of California make possible the protection of many of the best privately owned sugar pine stands in the State. The State appropriation is matched by the Federal Government, and private operators are encouraged to participate financially through voluntary contributions. The number of private cooperators was increased by 11 this year, bringing the total to 76.



Blister rust control units in California include areas managed largely for timber production as well as those set aside for recreational, aesthetic, and scientific purposes. In the case of commercial forests, control units are selected on a strictly economic basis. That is, the increased value expected from intensive management, of which blister rust control is a vital part, is compared with the cost of securing such additional return. Control measures are undertaken only where a net gain is indicated.

The location and extent of control units in noncommercial forests are determined by State and National Park officials assisted by blister rust specialists of the Forest Service. The objectives in establishing such units are the preservation of outstanding stands of white pine and the perpetuation of white pine in stands of mixed composition where its loss would seriously reduce the aesthetic value of the area.

#### CURRENT STATUS OF CONTROL PROGRAM

Control unit acreage was decreased by almost 26,000 acres in 1957. This net change resulted from the addition of 16,000 acres of new area and the deletion of 42,000 acres formerly included in control units. The principal additions were made on the Mendocino operation (3,500 acres), the Shasta-Trinity (5,600 acres), the Lassen (2,500 acres), and the Plumas (3,000 acres). The major deletion took place on the Stanislaus operation where 35,000 acres of privately owned land were withdrawn. This land is owned by several major lumber companies who are no longer interested in having ribes eradication work performed.

As a result of these changes in control unit acreage, the proportion of area having received initial treatment and the percentage on maintenance show little change from 1956. At present 31 percent of the control unit area within the State is on maintenance, and 81 percent has received an initial ribes eradication. Much of the unworked area is virgin timber where ribes eradication is being deferred until logging.

#### RUST SPREAD IN CALIFORNIA

The rust-spread situation throughout the State remained relatively unchanged in 1957. Again, as in 1956, a wet, cool spring provided optimum conditions for ribes infection, but very little summer intensification took place and by fall, when transmission of the disease from ribes to pine occurs, most of the originally infected leaves had dropped from the plants. The 1957 season, consequently, appears to be a year of little long-range spread.

The discovery of a new infection center in the Elder Creek drainage in Tehama County extended the known range of the disease in the Coast Range by about 20 miles. This infection center, which originated in 1944, consists of 70 infected sugar pines on about 10 acres and is situated in an area of low to medium rust hazard. Compared with other infection centers in the Northern Sierra and Cascade Ranges it was relatively inactive. All visible cankers were removed in the process of studying the center.

In Siskiyou County, where conditions are highly favorable for rust development, both the number of cankers and the acreage involved continued to increase. Infection centers as large as 300 acres have been found in which nearly every young sugar pine is infected. Heavy infection on mature trees is occurring in western Siskiyou County. Here, although the disease is not yet so severe as to have killed any mature trees, many have been weakened to the point of becoming prime targets for insect attack.

The Lassen operation found cankers in 31 out of the 50 areas examined for rust during the summer. Several new infection centers were discovered, and some of the previously known ones were found to have increased in size.

General and heavy infection was found in the Grizzly Creek drainage of Plumas County. Almost 25 percent of the 1,400 trees examined in 1957 were found to be infected. Sanitation work is now complete within the sugar pine management units in this area. Sanitation work is also nearly complete in the 25-acre Nigger Run Ravine center. Here, 38 percent of the trees inspected were found to be infected. Oldest cankers were of 1944 origin.

Several known infection centers in Eldorado County were examined this year. For the most part little sanitation work was needed. The Goggins Mine center in Long Canyon, however, was found to have been relatively active for the Central Sierra region. In 1951 when the center was discovered only 32 infected trees could be found. An additional 171 were found this summer in the same general area on about 3 acres.

A limited-scale detection program in Stanislaus and Tuolumne Counties failed to uncover any new infection centers.

RIBES ERADICATION - 1957
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Contracting, as in recent years, continued to play a dominant role in ribes eradication on the State and private as well as on the National Forest projects. During 1957 work was completed on nearly 500 separate contract lots totalling about 25,000 acres. The work was performed by about 100 contracting groups involving 200 to 300 individuals. The average price paid to the contractors was \$8.15 per acre.



Ribes were eradicated by hired crews on about 11,000 acres. The largest part of this, roughly two-thirds, was in National and State Parks. On other operations crew work remained a supplementary method reserved for areas requiring special eradication techniques not suited to contracting. In addition to the 36,000 acres worked, 24,000 acres were examined and found to require no work at present.

#### CONTRACT WORK

An excessive amount of rechecking was a general and major problem throughout the Region this year. As many as 8 or 10 inspections were sometimes necessary on a single item. The factors responsible for this condition were numerous and involved. Often a temporary surplus of contractors resulted in exceptionally low bids and a subsequent attempt by the contractors to complete an unprofitable item as quickly as possible. Inexperience in bidding and failure to examine work areas adequately were also responsible for some low bidding.

The effect of increasing the charge of excessive inspection from \$.75 to \$1.25 per acre was studied on the Lassen operation. The results are not yet available.

The problem of a temporary surplus of contractors was handled on two operations by offering for bid heavy-concentration work which was scheduled for chemical treatment. Contracts were let for as little as 5 acres in such areas. The main objective was to keep the maximum number of contractors busy.

Contract cancellations occurred on a larger scale than in previous years. In some cases cancellation and readvertising were done before any work had been performed. In others, failure to make satisfactory progress or to meet completion dates necessitated the action. One cancellation, the first yet encountered in the Region, involved a higher bid price following readvertising and a cash collection from the original contractor. Similar cases are pending on other forests. Completion dates were met for the most part, and the number of time extensions made was not excessive.

#### CREW WORK

With the exception of National Park operations, comparatively little work was done by hired crews. Small eradication crews were operated on two forests while on others checkers, TSI, and fire-crew personnel were used. The work was mainly of a clean-up nature in actively regenerating areas such as stream courses, roadsides, landings, skid trails and the like. On some operations such work constituted the entire treatment needed in maintenance areas. A spray crew operated on the Plumas through mid-July and finished the season doing hand eradication work. The use of 2,4-D pellets as a supplementary eradication method was given a limited field test on all operations.

## SURVEYS

Ribes surveys were performed on about 123,000 acres in 1957. This total includes 23,000 acres of advance checking in areas not previously worked, 56,000 acres of post-eradication checking, and 44,000 acres of current-season work inspection. A force of about 75 seasonal employees, less than a third of whom had previous experience, were required for the job. The major problems encountered were those of training such a large number of inexperienced technicians and of providing inspection service to early and late season contractors. The latter problem was solved to some extent on the several operations by training permanent employees as checkers and using them in this capacity intermittently throughout the summer. Wide-strip checking was given a limited test on the Shasta-Trinity operation and was used rather widely on the Lassen. All checking in Sequoia and Kings Canyon National Parks was by this method.

Sugar pine delineation surveys were conducted on 14,000 acres, the bulk of which was on the Shasta-Trinity, Lassen, and Plumas Forests. A disease survey was run in conjunction with all delineation work on the Shasta-Trinity this year. The information taken related mainly to the intensity of infection and the proportion of infected trees that could be saved through sanitation pruning.

A two-man reconnaissance party in Siskiyou County made an extensive survey of the amount, distribution and impact of blister rust in the Klamath River drainage. The disease has been present in this area for many years and is generally epidemic. The data collected have not yet been analyzed.

## SUGAR PINE MANAGEMENT

Silvicultural practices directed toward the production of high quality sugar pine received wider application this year than previously. Several timber sales aimed directly at favoring sugar pine production were made. These had the specific objectives of reducing competition from inferior species, increasing sugar pine stocking by providing suitable conditions for natural regeneration, and securing a K-V source for subsequent stand improvement work.

Planting and seed spotting received emphasis both in the establishment of new sugar pine plantations and as a stocking-improvement measure. Rodents were controlled in conjunction with seed spotting and natural regeneration operations. Some of the seed spotting work employed the use of endrin, a rodent repellent.



Three contracts for pruning were tried this year. One, on the Shasta-Trinity, was for a sanitation pruning job in the Lookout Point area. The other two, on the Eldorado, were for standard silvicultural pruning work. Ribes eradication contractors took the latter contracts. Thinning and girdling of hardwood species was performed along with the pruning job on some forests.

#### SPECIAL ACTIVITIES

A search for sugar pine trees exhibiting natural resistance to blister rust uncovered 43 rust-resistant candidates in Siskiyou County. These trees, which will be protected and cared for, will serve as a possible source of material for the ultimate production of rust-resistant planting stock. Five of the candidates had cones that will mature in 1958. Previously only 9 rust-resistant candidates had been located. These have been released and fertilized.

Late in the fall the canker-treatment method developed by Virgil Moss, U. S. Forest Service, Region 1, was given a field test on the Shasta-Trinity operation. The method employs the fungicide Acti-dione and offers a possible means of saving young trees infected with lethal bole cankers. Further testing will be done next year.

#### STATE AND PRIVATE PROJECT

The State of California continued its substantial financial assistance in the amount of \$115,000 for fiscal year 1958. Voluntary contributions from private owners amounted to \$6,833 for the same period. Control work on State-owned land is financed entirely by the State, while up to 50 percent of the cost of work on private land is contributed by the State. The individual owner is encouraged to contribute not less than 25 percent of the cost of the work on his land. At present private owners share to this extent in the cost of control on about 42,000 acres.

The initial coverage of the D. L. Bliss and Emerald Bay State Parks was completed this year. Initial work was begun in 1956. In all, 571 acres supporting unusually heavy ribes concentrations were treated. An additional 1,609 acres were examined and found to require no work at this time.

Inmate labor was used on the Calaveras State Park and Mountain Home State Forest. In the former the work was entirely hand eradication in areas previously worked, while at Mountain Home a combination of hand grubbing and chemical treatment was applied to areas being worked initially.

The State nursery at Magalia, California, was inspected for blister rust in the fall of 1957. At the time of inspection about 600,000 young sugar pine trees were growing in the nursery. No evidence of blister rust was discovered. The entire 215-acre buffer zone surrounding the nursery beds required eradication treatment again for the third successive season. Such intensive control measures are necessary because of the continuing disturbance that has occurred in the area, the presence of blister rust in the immediate area, and the 100 percent level of protection necessary. The eradication work was performed by inmate crews.

Ribes were eradicated from 13,000 acres of private land with an additional 8,000 acres being inspected and found to require no work at present. The work was split almost evenly between initial and reeradication, and all but a small amount of specialized eradication was by contract.

#### NATIONAL PARK PROJECT

Ribes were eradicated from 9,000 acres of National Park land in California. An additional 3,000 acres were inspected and found to require no attention at present. These accomplishments bring to 95 percent the proportion of control area worked initially and to almost 70 percent the proportion on maintenance. No changes in control unit acreage were made.

The work, which was mainly reeradication and maintenance was done by both force-account crews and contractors. About two-thirds of the work was done by crews. The average cost of the contract work, about \$9.00 per acre, remained at the same general level as that of the past few years.

Five camps were operated: Base Line, Crane Flat, and Chinquapin in Yosemite; and Redwood Mountain and Bullfrog Lake in Kings Canyon National Park. With the exception of Redwood Mountain, a 50-man camp, all were small, ranging from 8 men at Bullfrog Lake to 25 men at Base Line. Ribes surveys were made on about 20,000 acres.

Work in Lassen Park this year was mainly initial work in recently added control units. A small amount of maintenance work was also done. Work in Yosemite was largely reeradication in the Crane Flat and Bald Mountain units. Both contract and hired labor were used. Some maintenance work was done in the Wawona and Crane Flat units. Hired crews were used exclusively in Sequoia and Kings Canyon. The major job there was one of reeradication in Redwood Mountain and maintenance work in the Giant Forest unit. Initial work was begun in the Rae Lakes unit of Kings Canyon National Park which is located at the center of one of the Park's most heavily used high country areas. Whitebark pine is the timber species being protected here.



TABLE 1

## STATUS OF RIBES ERADICATION IN CALIFORNIA AS OF DECEMBER 31, 1957

Ownership	Control Operation	Control Units		Status of Ribes Eradication			
		Total Acres	Acres Unworked	Net Acres by Workings			Acres on Maint.
				Initial	Reerad.	Maint. Work	
WORK DONE BY THE STATE COOPERATIVE PROJECT							
PRIVATE LAND	Mendocino (Glenn County)						
	Klamath (Siskiyou County)	2,300		2,300	3,974	1,882	2,300
	Shasta-Trinity (Siskiyou and Shasta Counties)	4,583	885	3,698	903		220
	Modoc (Siskiyou and Modoc Counties)	6,546	5,377	1,169			
	Lassen (Tehama, Butte, Plumas, and Shasta Counties)	94,008	18,931	75,077	79,013	744	41,491
	Plumas (Plumas, Butte, Yuba, and Sierra Counties)	25,134	5,644	19,490	39,122		
	Tahoe (Sierra, Nevada, and Placer Counties)	1,908	47	1,861	901		
	Eldorado (Eldorado, Placer, and Amador Counties)	42,280	7,324	34,956	64,334		8,230
	Stanislaus (Calaveras and Tuolumne Counties)	8,112	329	7,783	14,478		1,304
	Sierra (Mariposa, Madera, and Fresno Counties)	14,278	1,465	12,813	9,429		620
	TOTAL	199,149	40,002	159,147	212,154	2,626	54,165
STATE LAND	Latour State Forest	1,878	323	1,555	838		583
	Blodgett Forest-Univ. of Calif.	1,160		1,160	2,998		
	D. L. Bliss-Emerald Bay State Parks	2,240		2,240			
	Calaveras Big Trees State Park	4,259		4,259	9,187		2,827
	Mountain Home State Forest	878	142	736	99		
	TOTAL	10,415	465	9,950	13,122		3,410
TOTAL STATE AND PRIVATE		209,564	40,467	169,097	225,276	2,626	57,575
WORK DONE BY THE FOREST SERVICE							
NATIONAL FOREST LAND	Mendocino	7,680	6,612	1,068			
	Klamath	2,238		2,238	2,326	765	2,238
	Shasta-Trinity	11,943	6,210	5,733	3,704		321
	Modoc						
	Lassen	20,456	6,687	13,769	9,762	106	4,063
	Plumas	61,386	21,504	39,882	65,570	395	2,066
	Tahoe	18,668	617	18,051	7,842		
	Eldorado	35,985	8,015	27,970	35,638		4,656
	Stanislaus	43,375	537	42,838	86,418		14,761
	Sierra	49,684	19,574	30,110	36,903		500
	Sequoia	5,888		5,888	99		
	TOTAL	257,303	69,756	187,547	248,262	1,266	28,605
WORK DONE BY THE NATIONAL PARK SERVICE							
NATIONAL PARK LAND	Lassen Volcanic	25,847	1,612	24,235	25,700	1,424	17,779
	Yosemite	85,667	3,903	81,764	103,894	7,318	54,847
	Sequoia-Kings Canyon	51,441	2,632	48,809	55,899	6,565	39,240
	TOTAL	162,955	8,147	154,808	185,493	15,307	111,866
ALL WORK DONE IN CALIFORNIA							
ALL CONTROL OPERATIONS		629,822	118,370	511,452	659,031	19,199	198,046

TABLE 2  
SUMMARY OF RIBES ERADICATION IN CALIFORNIA - 1957

Ownership	Control Operation	Acres			Total Man Days	Thousands of Ribes Destroyed	Total Acres Checked (All Classes)	Contract Eradication	
		Worked (Contract And Camp Crews)	Checked And Meeting Standards Without Work	Total				Acres Worked	Average Price Per Acre Paid to Contractor
WORK DONE BY STATE COOPERATIVE PROJECT									
PRIVATE LAND	Mendocino (Glenn County)								
	Klamath (Siskiyou County)	147		147	109	4	210	56	\$ 8.57
	Shasta-Trinity (Siskiyou and Shasta Counties)	1,504	778	2,282	1,155	199	9,136	1,453	9.20
	Modoc (Siskiyou and Modoc Counties)	1,169		1,169	803	151	6,265	1,152	9.13
	Lassen (Tehama, Butte, Plumas, and Shasta Counties)	3,572	1,540	5,112	859	86	6,197	1,599	5.83
	Plumas (Plumas, Butte, Yuba, and Sierra Counties)	3,102	2,860	5,962	1,972	479	8,818	2,829	8.59
	Tahoe (Sierra, Nevada, and Placer Counties)	385	285	670	125	23	721	383	5.86
	Eldorado (Eldorado, Placer, and Amador Counties)	1,220	2,653	3,873	463	49	4,346	1,220	7.35
	Stanislaus (Calaveras and Tuolumne Counties)	306	71	377	171	45	4,015	306	5.56
	Sierra (Mariposa, Madera, and Fresno Counties)	1,566	292	1,858	1,356	350	3,885	1,561	9.22
STATE LAND	Latour State Forest	98	420	518	62		2,312		
	Blodgett Forest-Univ. of Calif.	49	17	66	15	1	49	49	7.00
	D. L. Bliss-Emerald Bay State Parks	270	1,669	1,939	152	14	428	270	18.31
	Calaveras Big Trees State Park	552	217	769	525	77	1,466		
	Mountain Home State Forest	203		203	433	133	340	10	20.00
ALL WORK DONE BY THE STATE COOPERATIVE PROJECT		Initial Work	5,726	3,253	8,979	4,453	1,025		
		Reeradication	7,793	7,549	15,342	3,569	565		
		Maint. Work	624		624	167	21		
		All	14,143	10,802	24,945	8,189	1,611		
WORK DONE BY THE FOREST SERVICE									
NATIONAL FOREST LAND	Mendocino	101		101	99	19	1,611	101	3.70
	Klamath	98		98	20	1			
	Shasta-Trinity	103	843	946	431	32	7,172	41	20.98
	Modoc								
	Lassen	1,527	102	1,629	847	103	3,524	740	6.73
	Plumas	1,535	3,310	4,845	1,292	372	12,477	1,338	10.62
	Tahoe	1,549	1,869	3,418	870	109	7,514	1,542	9.09
	Eldorado	2,643	1,319	3,962	956	316	4,551	2,643	5.64
	Stanislaus	2,064	881	2,945	981	600	7,481	2,064	10.62
	Sierra	2,156	1,610	3,766	1,486	407	6,958	2,141	7.96
Sequoia	688	200	888	534	139	2,981	686	11.63	
ALL WORK DONE BY THE FOREST SERVICE		Initial Work	4,117	2,665	6,782	3,332	944		
		Reeradication	8,209	7,469	15,678	4,170	1,153		
		Maint. Work	138		138	14	1		
		All	12,464	10,134	22,598	7,516	2,098		
WORK DONE BY THE NATIONAL PARK SERVICE									
NATIONAL PARK LAND	Lassen Volcanic	1,645	458	2,103	712	205	3,857	980	7.99
	Yosemite	4,416	662	5,078	3,322	177	6,525	1,641	9.55
	Sequoia-Kings Canyon	3,035	2,032	5,067	1,556	57	9,875		
ALL WORK DONE BY THE NATIONAL PARK SERVICE		Initial Work	1,753	2,564	4,317	1,086	239		
		Reeradication	4,529	588	5,117	3,568	170		
		Maint. Work	2,814		2,814	936	30		
		All	9,096	3,152	12,248	5,590	439		
ALL WORK DONE IN CALIFORNIA									
ALL OWNERSHIPS ALL AGENCIES		Initial Work	11,596	8,482	20,078	8,871	2,208		
		Reeradication	20,531	15,606	36,137	11,307	1,888		
		Maint. Work	3,576		3,576	1,117	52		
		All	35,703	24,088	59,791	21,295	4,148		





UNITED STATES DEPARTMENT OF AGRICULTURE

# FOREST SERVICE

REGION SIX

THE BLISTER RUST CONTROL PROGRAM

PACIFIC NORTHWEST REGION

1957







BR  
REPORTS  
Annual - 1957  
(Pacific Northwest Region)

Portland, Oregon  
March 3, 1958

## THE BLISTER RUST CONTROL PROGRAM

### PACIFIC NORTHWEST REGION

1957

White pine blister rust is a fungus disease which is gradually destroying the white pine stands of the Pacific Northwest. It was accidentally introduced into Vancouver B. C. in 1910 and has since spread into all the white pine areas of Oregon and Washington.

Control can be achieved and protection given selected white pine stands by removing the ribes (currant and gooseberry plants), which are a necessary link in transmitting the disease to the pines, from the stand and a bordering protection zone.

The blister rust control programs in the Northwest are being undertaken by three federal agencies. No control work is being done by the States or private owners. The National Park Service is protecting from blister rust a representative white pine stand in Crater Lake National Park. The Bureau of Land Management and the U. S. Forest Service have selected areas for the management of sugar pine or western white pine on which it appears that these species are most suitable for the site. Both agencies have active projects underway in Southern Oregon.

Under the Lea Act of 1940, the technical direction and coordination of the entire program is a responsibility of the Forest Service.

### ACCOMPLISHMENTS - 1957

#### RIBES ERADICATION

Ribes (currant and gooseberry plants) were eradicated from areas of advance reproduction and established plantations where ribes regeneration had occurred to such an extent that the young white or sugar pines were again threatened by the rust.

Initial ribes eradication was done on clear-cut areas where white or sugar pine plantations are being established and on areas of advance reproductions where pine values are sufficient to warrant control expenditures. The results of the years work are shown in the following table entitled:





SUMMARY OF RIBES ERADICATION  
by  
AGENCY, CLASS OF WORK AND OWNERSHIP  
1957

Agency	Class of Work	Ownership	Worked	Acres : Meeting : Standard : w/o work	Total	:M Total Man Days	:Acres :Avg. Ribes :Worked:Pr. Des- : by :Pd. troyed:Contract:Ctr.
FS	Initial	N. Forest	1,529	704	2,233	528	140
	Rework	N. Forest	3,323	949	4,272	1582	212
		Private	225	--	225	91	4
		Total	3,548	949	4,497	1673	216
		N. Forest	4,852	1,653	6,505	2110	352
	All	*Private	225	--	225	91	4
		Total	5,077	1,653	6,730	2201	356 2,283 \$5.08
BLM		O&C	427	367	794	99	8
	Initial	*Private	280	376	656	107	3
		Total	707	743	1,450	206	11
		O&C	2,167	9,741	11,908	512	10
	Rework	*Private	358	342	700	90	2
		Total	2,525	10,083	12,608	602	12
		O&C	2,594	10,108	12,702	611	18
All Agencies	All	*Private	638	718	1,356	197	5
		Total	3,232	10,826	14,058	808	23 852 \$6.62
		N. Forest	1,529	704	2,233	528	140
	Initial	O&C	427	367	794	99	8
		*Private	280	376	656	107	3
		Total	2,236	1,447	3,683	734	151
		N. Forest	3,323	949	4,272	1582	212
	Rework	O&C	2,167	9,741	11,908	512	10
		*Private	583	342	925	181	6
		Total	6,073	11,032	17,105	2275	228
		N. Forest	4,852	1,653	6,505	2110	352
	All	O&C	2,594	10,108	12,702	611	18
		*Private	863	718	1,581	288	9
		Total	8,309	12,479	20,788	3009	379 3,135 \$5.53

\* The private land worked was in protection zones or small intermingled blocks that could not be eliminated.





## SURVEYS

Ribes surveys were made on many of the management areas to find out the number, size and distribution of the plants. The areas needing ribes eradication were determined from these surveys and they were the basis for preparing the work plans.

Pine appraisal and blister rust damage surveys were made on several extensive areas to determine the pine values and to measure the impact of the rust on the stand. The data are being analysed and decisions on the management of these areas will be reached. Accomplishments are shown below:

### SUMMARY OF SURVEYS

by  
AGENCY  
1957

Agency	Acres covered			Man Days
	Ribes	Appraisal & Damage	Total	
U.S. FOREST SERVICE	16,597	35,487	52,084	656
BUREAU OF LAND MANAGEMENT	8,348	15,840	24,188	202
ALL	24,945	51,327	76,272	858

### WHITE PINE MANAGEMENT

The intensity of management is steadily being increased on the white pine units. Close correlation between logging and blister rust control activities exists. The Rogue River National Forest now has 67 western white or sugar pine plantations comprising about 1,300 acres. The Umpqua National Forest during 1957 planted 758 acres to sugar pine and sugar pine was successfully established on 111 acres by protecting from rodents the natural seed fall from seed trees left at the time of logging. Cankers were removed from 3,914 trees on national forest lands and 3,348 trees on Bureau of Land Management areas.

### DEVELOPMENT OF RUST-RESISTANT STRAINS OF WHITE PINES.

In conjunction with Region 5 a two-man crew was employed to search for rust-resistant sugar pines. Sixteen trees were located. Three more were found by Bureau of Land Management personnel who also located an additional three trees that may be rust-resistant. In previous years 92 apparently rust-resistant western white pines that are candidates for rust-resistant transmitters have been found.





The resistant trees are located as shown below:

1.	Sugar pines	
a.	Umpqua National Forest	4
b.	Rogue River " "	12
c.	Medford District BLM	<u>3</u>
		19
2.	Western white pine	
a.	Umpqua National Forest	75
b.	Willamette " "	3
c.	Mt. Hood " "	6
d.	Mt. Rainier National Park	<u>8</u>
		92

Seed has been collected from a number of the western white pines and testing the individual parent for the ability to transmit resistance to progeny will be done in 1958. No seed has been collected from any of the sugar pines. All of the sugar pines and most of the western white pines have been released from competing vegetation and have had fertilizer applied to the soil in an effort to induce earlier and more prolific seed production.

An outplanting and prospective seed orchard site of about  $2\frac{1}{2}$  acres on the Rogue River National Forest has been cleared and fenced in preparation for planting grafts from the resistant trees. Sites have been selected and are being prepared at the Wind River Nursery for progeny tests; for transplanting understock for future use and for outplanting grafted material.

#### STATUS OF THE CONTROL PROGRAM

The present status of ribes suppression in the white pine management areas is shown in the table entitled:





STATUS OF RIBES ERADICATION  
IN THE PACIFIC NORTHWEST  
BY AGENCY AND LAND OWNERSHIP  
AS OF DEC. 31, 1957

Admin- istra- tive Unit	Land Owner- ship	Control Area Acres:				Required Future Work			
		In	In	In	Acres	Worked	Initial	Re-	Maint.
		White	Pro-	Control	ly		Rad	Work	% on Maint.
		Pine	tection	Unit					
		Mgt.	Zone						

FOREST SERVICE

Umpqua	N.F.	58,134	6,139	64,273	9,939	54,334	9,011	928	1
	Private	1,034	96	1,130	--	1,130	--	--	--
	Total	59,168	6,235	65,403	9,939	55,464	9,011	928	1
Rogue River	N.F.	57,175	150	57,325	57,231	94	44,181	13,050	23
	Private	--	2,934	2,934	2,907	27	2,907	--	--
	Total	57,175	3,084	60,259	60,138	121	47,088	13,050	22
Siski- you	N.F.	28,429	2,523	30,952	30,952	--	15,351	15,601	50
	Private	--	2,154	2,154	2,154	--	1,323	831	39
	Total	28,429	4,677	33,106	33,106	--	16,674	16,432	50
To- tal	N.F.	143,738	8,812	152,550	98,122	54,428	68,543	29,579	19
	Private	1,034	5,184	6,218	5,061	1,157	4,230	831	13
	Total	144,772	13,996	158,768	103,183	55,585	72,773	30,410	19

BUREAU OF LAND MANAGEMENT

Medford	O&C	48,845	1,591	50,436	49,555	881	19,314	30,241	60
Dis-	Pub. Dom.	1,463	164	1,627	1,617	10	467	1,150	71
trict	N.F.	--	10	10	10	--	--	10	100
	Private	--	9,131	9,131	8,021	1,110	2,868	5,153	56
	Total	50,308	10,896	61,204	59,203	2,001	22,649	36,554	60

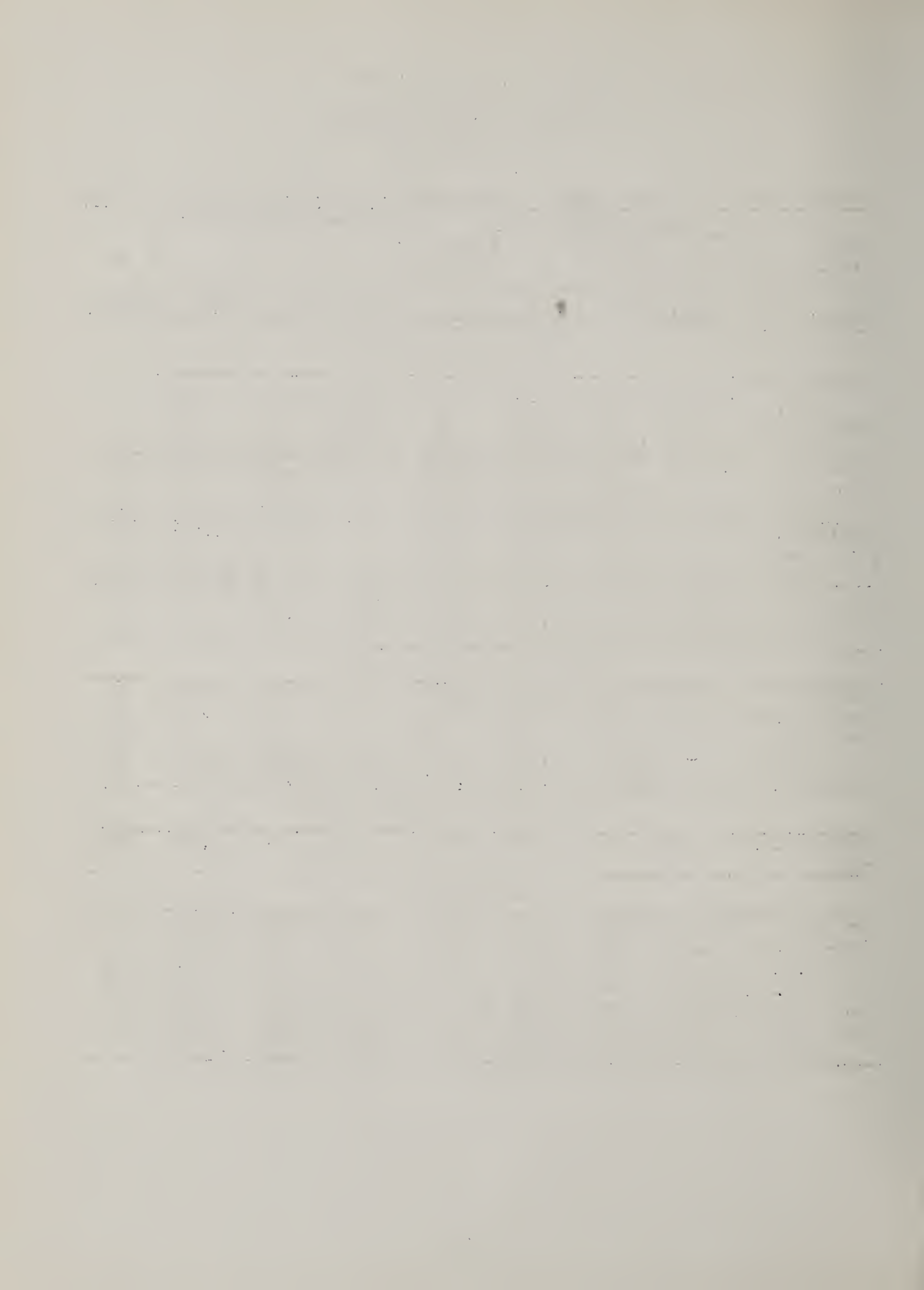
NATIONAL PARK SERVICE

Crater Lake	N.P.S.	3,632	--	3,632	3,632	--	--	3,632	100
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ALL AGENCIES

Re- gion- al	O&C	48,845	1,591	50,436	49,555	881	19,314	30,241	60
	Pub. Dom.	1,463	164	1,627	1,617	10	467	1,150	71
	N.F.	143,738	8,822	152,560	98,132	54,428	68,543	29,589	19
	N.P.S.	3,632	--	3,632	3,632	--	--	3,632	100
To- tals	Total Fed.	197,678	10,577	208,255	152,936	55,319	88,324	64,612	31
	Private	1,034	14,315	15,349	13,082	2,267	7,098	5,984	39
	Total	198,712	24,892	223,604	166,018	57,586	95,422	70,596	32





## PLANS FOR 1958

Ribes eradication will be continued on plantations, areas of advance reproduction and on those areas recently disturbed and the protection zones in which the ribes endanger adjacent white pine. Ribes eradication will not be done on mature timber areas which ultimately will be clear-cut and regenerated to pine where the site and aspect are favorable.

The aerial spraying with herbicides of ribes in clear-cuts by helicopter will be tested on the Rogue River National Forest.

The usual ribes surveys adequate to determine the need for and to plan eradication work and to measure the quality of the eradication work are planned.

Damage and appraisal surveys will be done on specific areas to determine their status, to plan sanitation pruning and to reach management decisions. The surveys started in 1957 on the sugar pine areas of the Siskiyou National Forest will be finished in 1958.

The project to develop and produce rust-resistant western white pine and sugar pine planting stock will be organized and this work will be greatly expanded during the year.

## THE FOREST SERVICE PROJECT

Long range management plans for the western white and sugar pine units are being prepared on the Rogue River and Umpqua National Forests. Management plans for the Siskiyou National Forest will be made after completion of the damage and appraisal surveys scheduled for 1958. The units are being subdivided into areas that will be clear-cut and regenerated to one of the white pines where the site is suitable and into areas supporting uneven aged stands which will be selectively logged. Ribes eradication is being restricted to areas of advance reproduction, to plantations and to the necessary protection zones.

The sugar pine areas on the Umpqua being considered for management were increased from 11,878 acres to 59,168 acres. Some 6,235 acres of protection zone also will be required. Most of the areas will be clear-cut and those sites where sugar pine appears to be the most productive will be regenerated to this species. Ribes eradication will follow logging and will be restricted to the clear-cut areas, hence it will be decades before all the initial work is done.

Work on the Siskiyou National Forest was restricted to damage and appraisal surveys on the sugar pine areas acquired from the BLM in the recent exchange of lands. During the season 17,960 acres were covered. Preliminary analyses indicate that the level of infection is quite low and that little recent infection has taken place. The remaining 15,146 acres will be surveyed in 1958.





The Rogue River National Forest continues to intensify the management of its white pine areas. Sanitation pruning was done on crop trees in areas of advance reproduction. Seeding and planting of clear-cuts were successfully accomplished. An outplanting site and prospective seed orchard site for rust-resistant pines were cleared and fenced.

A specially trained and qualified two-man crew spent about five weeks searching heavily infected stands in the Rogue River and Umpqua National Forests for rust-resistant sugar pines. Twelve trees on the Rogue River and four trees on the Umpqua were found. These 16 rust-resistant sugar pines and most of the 92 rust-resistant western white pines previously found were released from competing vegetation and have had fertilizer applied in an effort to increase seed production.

During 1957 ribes were eradicated from 5,077 acres and surveys showed that an additional 1,653 acres required no work. Both contractors and force account crews were used in doing the job.

Appraisal and damage surveys were made on 35,487 acres of national forest land and ribes surveys on 16,597 acres. A total of 656 man days were required.

#### THE BUREAU OF LAND MANAGEMENT PROJECT

The Bureau operated a small camp employing 14 men at Trapper's Cabin in the Medford District. All work in this unit needed for the present eradication cycle was completed during the season. No activity is planned for 1959 in this unit.

Sanitation pruning was done on infected crop trees in areas of advance reproduction. Blister rust cankers were removed from 3,348 sugar pines.

Damage and appraisal surveys were done on 13,920 acres and ribes surveys on 8,348 acres. Disease data indicate that little infection has occurred during the past five or six years in this general area. An appraisal reconnaissance and survey was made of the Deadman Creek area on the Roseburg District to assist in reaching decisions concerning the desirability of managing this area of about 8,000 acres for sugar pine.

Three rust-resistant sugar pine trees and three probably rust-resistant sugar pines were found by BLM personnel. These trees will be included in the rust-resistant program now being developed in the Northwest.

Ribes were eradicated from 3,232 acres and surveys indicated that an additional 10,826 acres required no work at this time. Contractors worked 852 acres and force account crews worked 2,380 acres.





Considerable Ribes bracteosum were found on some streams in the area.

#### PARK SERVICE PROJECT

A reconnaissance was made to check on the maintenance condition of the Blister Rust Control Unit in Crater Lake National Park. No infection was seen and no work was deemed necessary. Periodic examinations will be made to determine the status of the rust within the Park and to check on the need for any maintenance work.

The damage survey data taken in 1956 on the control areas in Mt. Rainier National Park were analysed and a report made to the Park Superintendent. Because of the high cost of continuing and maintaining control and the general establishment and growth of other tree species on the area it was recommended that control work be discontinued. The degree of control already achieved will suffice to maintain western white pine in the stand for many years. As a result of the study the Park Service decided to eliminate these areas from further control work.





# **WHITE PINE BLISTER RUST CONTROL**

**REGIONS SEVEN and EIGHT**

**CALENDAR YEAR 1957**



**UNITED STATES DEPARTMENT OF AGRICULTURE**

**FOREST SERVICE**





WHITE PINE BLISTER RUST CONTROL IN THE EASTERN REGION

ANNUAL REPORT FOR 1957

United States Department of Agriculture

FOREST SERVICE

Region 7

Upper Darby, Pa.



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## IMPORTANCE OF WHITE PINE

White pine extends from the foothills of New England to the higher elevations of northern Georgia. Because of its ability to reproduce naturally, areas of new growth are continually changing the pattern of distribution within the natural range. This is particularly true of old fields and pastures abandoned to agriculture and now reproducing white pine. Being tolerant to shade in its early life it frequently becomes established as an understory in hardwood areas, however, release is necessary if the white pine is to survive and mature. It also reproduces abundantly on cutover areas. Over seven million acres in the Region are sufficiently stocked with white pine to justify protection from the blister rust disease as an additional management cost. Maturity value of eastern white pine is estimated to be in excess of \$800 million. In addition to its commercial value white pine adds beauty to the landscape, enhances recreational areas and serves as excellent watershed protection.

Stumpage prices in New England range from \$12 to \$35 per thousand board feet. The higher prices are paid for better grade timber on accessible areas. In northern New York as much as \$40 per thousand was paid as a result of the demand created by construction on the St. Lawrence Seaway project and the Plattsburg Air Base. Prices in Pennsylvania remained strong with \$20 - \$35 M and in one area old mature pine, which is very scarce, brought \$125 M on the skidway. Prices in the southern states ranged from \$18 to \$30 M during the year.

Reports in the Commercial Bulletin indicate that there is a general trend on the part of wholesalers toward increased stocking of eastern white pine. This is attributed to improved grading and manufacturing standards promoted by lumbermen through their associations. Eastern white pine is used in considerable quantity for interior finish. Many mills are modernizing to improve grade, and efficiency of operation. Increasing interest in good white pine management and improved cutting practice is being shown by many owners. This together with continued increase in white pine reproduction and expanding markets should insure a strong white pine economy in the Region.

## PURPOSE OF THE BLISTER RUST CONTROL PROGRAM

The purpose of the blister rust control program is to establish and maintain control of the disease in pine stands that show promise of sufficient value at maturity to warrant added costs of protection measures. Selection of stands to be



protected is based on quality, quantity and age of the stands. The 7.3 million acres of white pine in the Eastern Region listed for protection from blister rust requires that currants and gooseberries be removed from 17.3 million acres. About 10% is federally-owned, 5% is in State and other public ownerships and the remaining 85% is distributed among some 220,000 private owners.

Control has been established on 91.3% of the present control area. The objective is to increase the protection, particularly in those states which are below the over-all average, maintain the control that has been established and protect new stands of white pine as they become a part of the forest.

#### DISEASE AND DAMAGE

In recent years no serious outbreak of the disease has been reported on pine where adequate elimination of currants and gooseberries has been accomplished. In northern New England infection is scattered and generally light in controlled areas. In contrast very heavy infection can be found in some unprotected areas. A few small areas showing heavy infection were found on maintenance area following cutting operations. Control work in the towns of Alexandria and Brasher, New York has been discontinued until disease studies can be made. Very little infection is present and ribes eradication costs are excessive in relation to the damage that has been occurring. Infection studies are planned to verify the soundness of eliminating the ribes eradication work in these areas. Blister rust was not reported in any new counties where infection had not previously been observed. Cankers of recent origin were found in young reproduction in Bedford, Wyoming, Susquehanna, and Somerset Counties of Pennsylvania; Giles and Highland Counties of Virginia; and in Mercer, Pocahontas and Raleigh Counties of West Virginia. The highest percentage of infection was in a few areas not previously worked in Giles and Highland Counties of Virginia.

Ribes infection in the New England area was reported generally medium to very heavy except in the coastal region of New Hampshire where it was very light. It was generally heavy in Pennsylvania, Maryland, northern Virginia and northwestern West Virginia. Medium infection was reported for southwest Virginia and southeastern West Virginia with a trace in North Carolina. Ribes infection was not reported in Tennessee and Georgia.

Weather conditions during late summer and fall were not favorable for transmitting viable spores to white pine.



# FOREST PEST CONTROL PERSONNEL IN EASTERN REGION

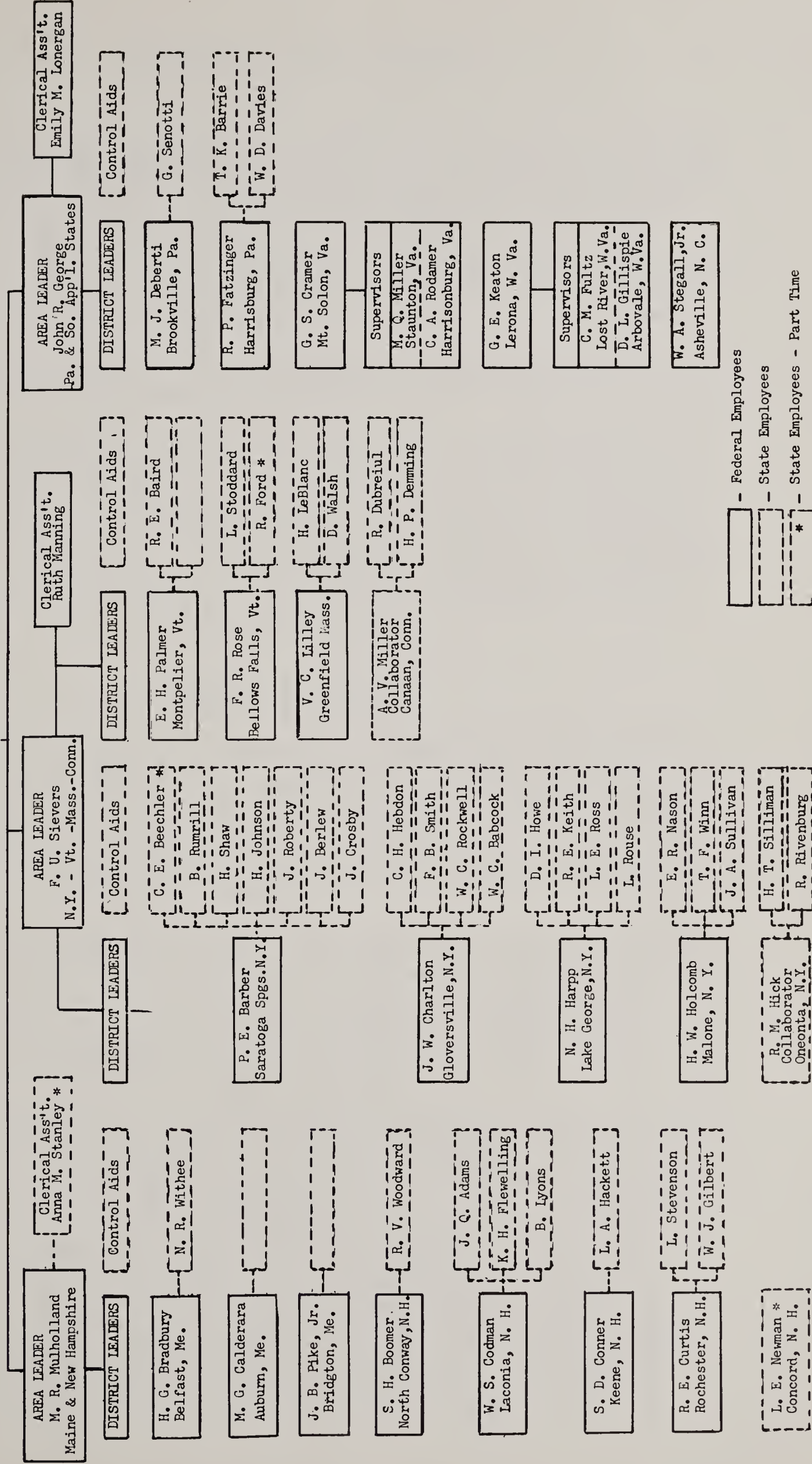
## REGIONAL FORESTER

### R-7 DIVISION OF STATE AND PRIVATE FORESTRY

#### SECTION-FOREST PEST CONTROL

SECTION CHIEF - G. R. ALLISON

ASST. SECTION CHIEF - P. H. SIMMONDS





## ORGANIZATION AND COOPERATION

The Lea Act of April 26, 1941 (58 Stat. 168:16 U.S.C. 594a) authorizes the Secretary of Agriculture to cooperate with states and other agencies in the control of white pine blister rust. The Act is implemented by the Forest Service in this Region through the leadership and technical direction of the Pest Control Section, in the Division of State and Private Forestry. Field direction is provided by 23 district leaders under the supervision of three area leaders.

Headquarters for E. H. Palmer were transferred in June to the Vermont Department of Forest and Parks at Montpelier, Vermont.

Cooperative blister rust control on a reimbursement basis is being tested in five states. The plan has been working out very satisfactorily. It has provided for full time employment of seven field assistants in New Hampshire, two in Vermont and one in Maine. Plans are in preparation for two additional full time men in Maine. In Virginia and West Virginia reimbursement methods have eliminated the dual federal and state payrolls. All labor is now employed by the States.

## STATUS OF CONTROL

As the result of reappraisal of white pine and protection area during recent years the net control acreage has been considerably reduced. In 1951 the control area contained 18.2 million acres. The current area comprises 17.3 million acres; a reduction of 900,000 acres. This reduction is a result of careful consideration in relocating control boundaries consistent with infection hazards.

The net change in white pine acreage has been negligible. Losses caused by harvesting have been largely offset by new reproduction. Much of this has developed on abandoned farm lands. A large part of the new reproduction falls within established protection area and control can be maintained with a minimum of new protection boundary.

Control has been established on 15,850,825 acres or 91.3% of present control area. The chart on page 10 indicates the progress made toward this accomplishment. Partial control has been established on an additional 8% of the area. Under some conditions control is established in one operation although in most cases it requires two or more workings at periodic intervals to reduce ribes to an allowable standard. When this point is reached control can be maintained through periodic examinations to locate ribes regeneration caused by fire, logging, construction or natural causes. Prompt action to destroy hazardous regeneration that occurs over limited areas provides adequate protection at a minimum of cost.



The following table shows the distribution of white pine and control area among the various ownerships and indicates the status of control:

<u>Ownerships</u>	<u>Acres of White Pine</u>	<u>Acres of Control Area</u>	<u>Percent of Control Area</u>	
			<u>Initially Worked</u>	<u>On Mainte- nance</u>
State and Private Lands	6,153,790	15,326,032	98.8%	90.6%
National Forests	1,066,558	1,882,748	99.9%	96.3%
National Parks	78,827	156,692	99.9%	98.8%
Indian Lands	22	445	100.0%	100.0%
Totals	7,299,197	17,365,917	99.0%	91.3%

(Further detail on the status of control is shown in tables 6 and 7 of the Appendix).

The greater portion of the control problem is on state and private lands. This includes 165,719 acres requiring initial work and 1,278,053 acres that will require further attention before control is established. Ribes eradication on the National Forests includes 683 acres of initial work and 68,865 acres of rework. On the National Parks 213 acres require initial work and 1,559 acres are in need of rework. Control work on Federal lands is performed as needed.

Continued surveillance of maintenance area through periodic examinations with removal of ribes from limited regenerative areas is becoming a major part of control operations. Most eradication needed is due to disturbances such as logging, fire, blowdowns, etc. Experience to date shows an average of less than 10% of the maintenance area examined requires intensive eradication. As control becomes established, personnel capable of determining pine values, rust conditions and eradication needs are essential to provide economical protective measure. There is little need for large eradication crews. Well trained scouts working individually or in units of two or three are proving most effective in determining and carrying out needed control measures.

#### Ribes Ecology Studies

Progress has been made on ribes ecology studies in the Region. A meeting was held in January to discuss accomplishments and plans were drawn for continued studies during 1957. District Leaders R. E. Curtis, J. W. Charlton and R. P. Fatzinger were assigned to collect field data. Area and district leaders cooperated in providing data and information on plot locations. Data from approximately three hundred study plots will be analyzed to determine recognizable



factors influencing ribes growth habits by species under varying site conditions. It is believed that such factors exist in sufficient frequency to form a pattern of associations. If major factors contributing to a recurring ribes problem can be recognized and used by field personnel in a simplified form, the problem of maintaining control would be considerably reduced.

## CONTROL ACTIVITIES IN 1957

### Summary of Accomplishments on Lands of All Ownerships

A total of 1,920,145 acres of control area was given attention during 1957. Of this 592,873 acres were mapped, 57,615 acres were initially worked and 318,998 acres including 53,351 acres of maintenance area were re-worked. Examination of 949,680 acres of maintenance area showed no intensive ribes eradication was needed to maintain control.

### Skilled Men Needed for Survey Work

Maintenance has been established on 91.3% of the control area. Progress toward this accomplishment has been at an average of 3.5% of control area per year during the last seven years. Examination of areas on maintenance exceeded one million acres this year. Projected work loads indicate maintenance examination will increase during the next few years. To carry on this type of work in the most proficient manner, year round employees skilled in control area examination and eradication procedures will become increasingly valuable. Only trained and experienced men are qualified to do this work. Reasonable assurance of steady employment with some degree of security are necessary to attract and hold these men. Recognition of this situation has been made by a number of states as mentioned under section "Organization and Cooperation" in this report. Planned retirements without replacement of some district leaders in the near future will place an even greater importance on the availability of experienced control aids.

### Ribes Eradication Methods

Hand eradication is still used in the major portion of control work since most of the ribes are small individual bushes in scattered locations. Much of this work is done by single scouts. Areas requiring more intensive eradication are worked by two or more scouts or by seasonal laborers working in crews of two to four men.

The chemical 2, 4, 5-T in both an aqueous and oil base solution was used more extensively this year. A total of 2,448 acres were treated, using 5,390 gallons of solution. Most of this work was done in heavy populated ribes concentration areas. A total of 733 man days were used on chemical eradication.



Observations of sprayed areas seem to indicate overall satisfactory results. A few exceptions have been observed but it is generally agreed that the use of chemical control under certain conditions has a decided advantage over hand-pulling. Many areas show 90-98% ribes kill on first application. During 1957 several districts in New England used 2, 4, 5-T in an oil base (#2 fuel oil) solution for treatment of scattered gooseberries. This was used during early and late season work. Aqueous solutions at the rate of  $1\frac{1}{4}$  ounces of 2, 4, 5-T per gallon (4 pound acid equivalent per gallon) are used on *R. glandulosum* and *R. americanum* concentrations with good results.

Some experimental work was done with a back-pack power mist blower. Results were not satisfactory because of a safety hazard and poor kill. If equipment, safe to operate is available these tests will be continued with stronger formulations in 1958.

A small amount of the chemical Kuron was tried but results have not been determined due to the prolonged killing action of the chemical.

#### Checking Ribes Eradication Work

In northern New England efficiency checks were made, particularly in and near ribes concentrations. An estimated 1% check was made of this work with additional checks on scout eradication. In Area I a revised form was used to record application and results on chemically treated areas. A more intensive checking program is planned as full time assistants are assigned to all districts.

Checking was increased in Vermont but total accomplishments fell short of the desired 1% check of control area worked. There is a need for more checking on maintenance area examined. In Massachusetts it was recommended that the district leader detail more crew supervision to the control aids and spend the additional time in checking completed work.

In New York efficiency checks performed by the district leaders and their assistants have proved quite successful in maintaining recommended standards for ribes eradication work. A 1% check of worked areas was accomplished. Additional checking is desired on maintenance work. The suggestion of employing an area checker meets with the approval of most of the district leaders.

Checking in Pennsylvania and the southern states was mainly applied to ribes sites. Efficiency checks were made in most of the worked area in Pennsylvania. A few areas required re-working due to inexperienced labor. All eradicated areas in Virginia were checked. Additional checking is needed on the blockout acreage to insure that control standards are maintained. In West Virginia checking indicated practically all work was of a high caliber.



## Nursery Sanitation

An estimated 35 million white pine seedlings were produced in 34 forest tree nurseries in the Region this year. Expanded facilities under the Soil Bank program are now operating in some states. Control programs are being adjusted to carry on necessary sanitation work. During 1957 initial control was completed on the Oak Orchard Nursery in New York and initial control was partially completed on the new Greenbush State Nursery in Maine. Re-examination of seven nurseries in the Region was completed as scheduled.

## Canker Elimination

Canker elimination was performed as part of the control operations in New York, Maryland, and North Carolina. This work was mostly in recreational areas on state lands for aesthetic purposes or the elimination of hazardous conditions. Accomplishments were as follows:

<u>State</u>	<u>No. of Examined</u>	<u>Fatally Infected Pines Cut</u>	<u>No. of Trees Treated</u>	<u>No. of Cankers Removed</u>	<u>Man Days</u>
New York	16,939	386	599	889	91 - $\frac{1}{2}$
Maryland	50	7	-	8	1
North Carolina	80	17	26	61	- $\frac{1}{2}$
Total	17,069	410	625	958	93

## Informational Activities

Informational activities were carried on more actively in all states cooperating in the 1957 program. These were through the usual medium of meetings (132), press releases (120), television and radio (6), demonstrations (67), show-me-trips, (139) and blister rust films (176). Classroom and field instruction concerning blister rust and its control was presented to forestry students at six colleges and universities. A close touch was maintained with State Foresters and their staff in the planning and operation of the program.

## WORK ON STATE AND PRIVATE LANDS

Twelve states participated in blister rust control during 1957. Survey and eradication accomplishments are shown in Tables 2, 3 and 5 of the Appendix. Area cleared of ribes on state and private lands amounted to 365,558 acres this year. Of this amount 15.3% was initial work, 71.4% was rework and 13.3% was maintenance work. The maintenance area examined

totaled 919,332 acres, 48,640 acres of which required intensive eradication. The small amount of control area requiring maintenance work (5.3% of examined area) indicates eradication standards are effective. The supply of seasonal labor was adequate and turnover very low. Labor was generally of better quality than available last year.

#### WORK ON THE NATIONAL FORESTS

Eleven National Forests in Regions 7 and 8 have 1,882,748 acres of control including 1,066,558 acres of white pine. This is a slight increase over the previous year in both pine and total control area. Control has been established on 96.3% of this area. The largest pre-maintenance work load is on the George Washington National Forest. This is caused by the large amount of ribes bearing acreage in the control area and new reproduction recently mapped for control. It should be possible to maintain satisfactory control on national forest land at the present level of operation.

The Monongahela National Forest with 88,822 acres including 47,570 acres of white pine is now 89.3% on maintenance. Of the 9,630 acres examined, 1,712 acres required intensive eradication. No initial work remains to be done. Examination of 22,000 acres is scheduled for 1958.

The George Washington National Forest with 502,928 acres of control including 223,372 acres of white pine is now 90.3% on maintenance. During 1957, 66,713 acres were examined and 7,934 acres required eradication, including 578 acres of first work.

On the Jefferson National Forest control area was increased to 126,719 acres as the result of mapping new pine areas. Control has now been established on 95.8% of the area. In 1957, 923 acres of first work and 305 acres of rework were completed. Area examination totaled 13,496 acres.

The North Carolina National Forest containing 230,947 acres of control for protection of 136,365 acres of white pine is now 98.6% on maintenance. In 1957 examination of 3,481 acres resulted in initial eradication on 36 acres.

Control on the National Forests is carried out as needed. Getting the entire control area on the National Forests on maintenance as soon as possible is the primary objective. Progress is being made toward this objective.

No work was scheduled on the seven remaining National Forests in 1957. Control has been established on the White Mountain, Green Mountain, Cumberland, Sumter and Chattahoochee National Forests. These are so nearly ribes-free that only infrequent inspections are necessary. Small portions of the Allegheny and Cherokee are scheduled for examination and work in 1958.



## WORK ON THE NATIONAL PARKS

The five National Parks in the Region contain 156,692 acres of control area including 78,692 acres of white pine. All but 1,772 acres of the control area is on maintenance.

An examination of 3,935 acres was made on the Acadia National Park in Maine. Ten acres were eradicated to protect pine reproduction. The entire control area of 17,318 acres is on maintenance. Plans call for additional examination of the pine and ribes conditions as funds permit.

Eradication on the Great Smoky National Park was limited to 110 acres of rework on the Hazel Creek area in Swan County. There was a marked reduction in the number of ribes removed as compared with the initial work. During recent years the entire control area was checked to determine whether ribes had come back on old sites or other unknown sites. The pattern indicates that regeneration has been negligible. For this reason 1958 checks will be limited to previous ribes-bearing sites and random checks of likely sites.

On the Shenendoah National Park 2,105 acres of maintenance area were examined and 25 acres required eradication. The entire control area of 14,270 acres is on maintenance.

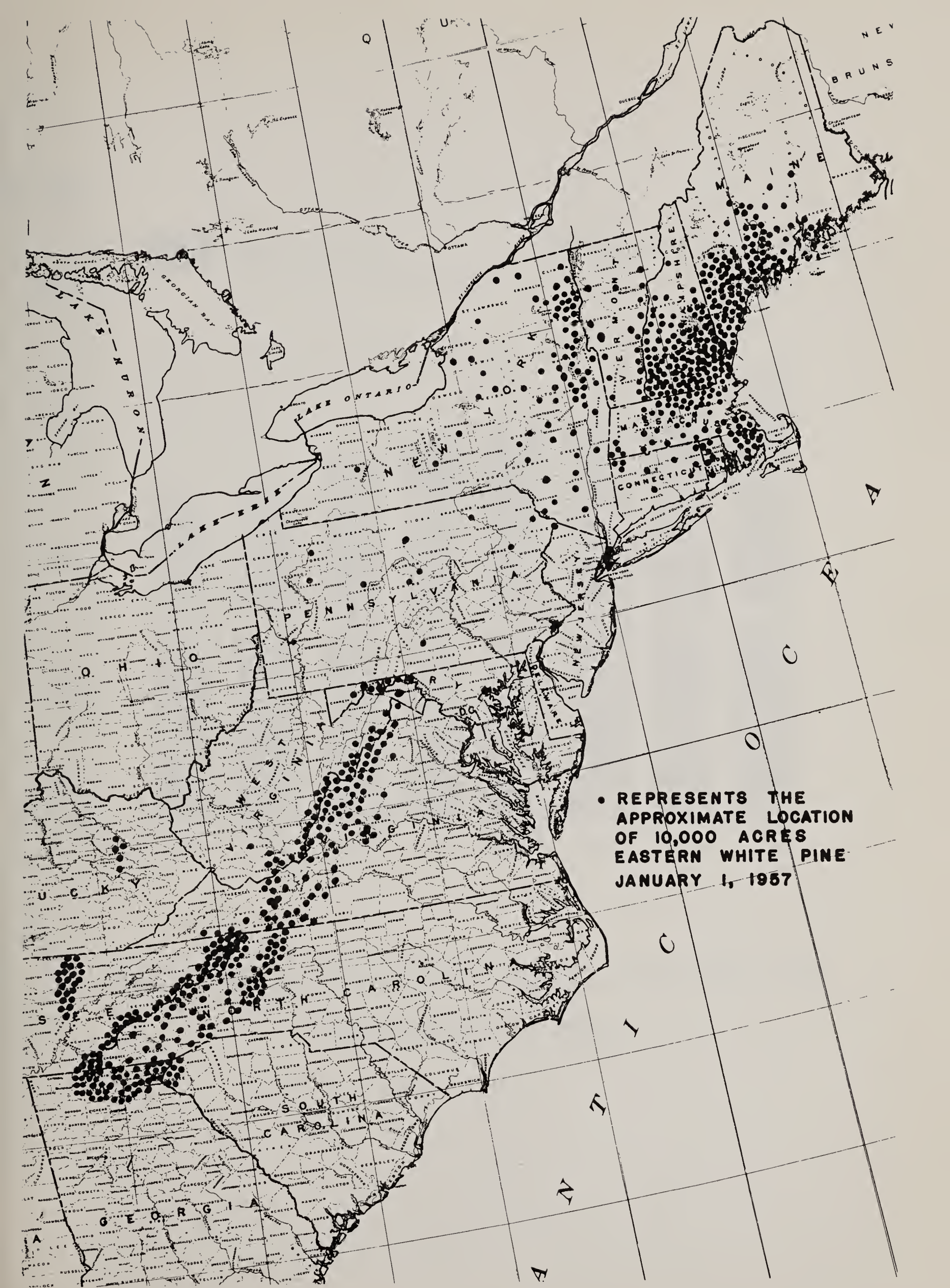
Work on the Blue Ridge Parkway was limited to surveys. A total of 3,752 acres were examined. No work was performed on the Saratoga Battlefield.

## SAFETY

An otherwise perfect record for blister rust personnel in vehicle operation was broken by one accident in November. No lost time accidents were reported by federal personnel during the year. This is an excellent record and a credit to those employed on the program. Safety through training and in practice is a continuing part of all blister rust work.



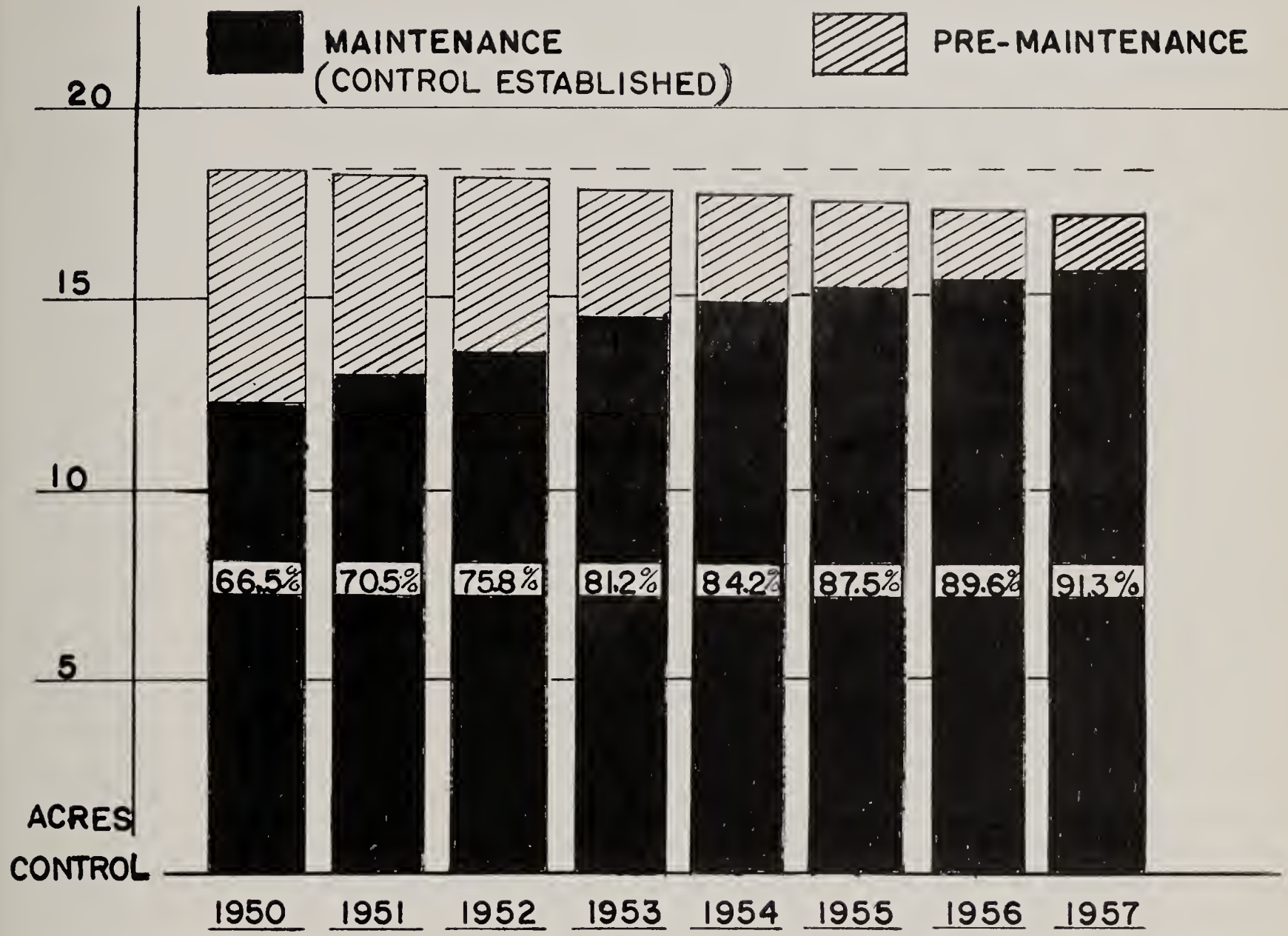








MILLIONS



WHITE PINE BLISTER RUST CONTROL - REGIONS 7 & 8

MAINTENANCE STATUS



## APPENDIX

### Statistical Tables





Table 1 - Informational & Service Activities - 1957

State	Meetings Addressed		Programs Radio & T. V.	No. Items Published	No. Demon- strations Placed	Show- Me Trips	Film Showings	
	No.	Attend- ance					No.	Attend- ance
Me.	11	463	5	6	9	13	5	290
N. H.	28	1,294	-	27	10	35	10	389
Vt.	7	102	-	20	8	4	1	30
Mass.	1	6	-	-	-	-	1	60
Conn.	1	43	-	-	-	1	1	43
N. Y.	52	1,548	-	43	20	44	136	10,727
Pa.	3	170	-	7	1	2	13	500
Md.	-	-	-	-	-	1	-	-
Va.	1	37	-	9	5	3	-	-
W. Va.	11	-	-	8	11	18	2	52
N. Car.	-	-	-	-	-	3	-	-
Tenn.	-	-	-	-	-	3	-	-
By Area Leaders	17	743	1	-	3	12	7	310
Total	132	4,406	6	120	67	139	176	12,401





Table 2 - Local Cooperation on Blister Rust Control

Work During 1957

State	No. of Cooperators			Amount Expended			
	Individ- uals	Towns	Counties	Individ- uals	Towns	Counties	Total
Me.	-	85	-	\$ -	\$18,555	\$ -	\$ 18,555
N.H.	-	75	-	-	21,923	-	21,923
Vt.	1	21	-	99	5,101	-	5,200
Conn.	-	3	-	-	1,416	-	1,416
Mass.	-	1	-	-	560	-	560
N.Y.	1	-	17	842	-	20,604	21,446
Total	2	185	17	941	\$47,555	\$20,604	\$69,100

Local Cooperation on Blister Rust Control Work1918 - 1957 Inclusive

State	Individual Cooperation		Town Cooperation		County Cooperation	
	No. Cooperators	Amount Spent by Individual Cooperators	No. Town Appropri- ations or Con- tributions	Amount of Town Money Expended	No. County Appropri- ations or Allotments	Amount Spent by Counties
Me.	11,133	\$ 86,309	1,637	\$ 308,047	2	\$ 601
N.H.	705	51,927	2,706	843,724	-	1,724
Vt.	2,391	77,977	504	111,794	-	-
Mass.	21,975	119,354	74	28,918	-	-
R.I.	8	581	-	-	-	-
Conn.	527	12,670	221	48,645	-	-
N.Y.	5,991	177,999	39	10,831	280	324,624
Pa.	303	2,273	-	-	-	-
Va.	1	276	-	-	-	-
W. Va.	1	358	-	-	-	-
Total	43,035	\$529,724	5,181	\$1,351,959	282	\$326,949



Table 3 - Surveys During 1957

State	Ownership	Acreage of Control Area		Total Man-Days
		Examined for Any Purpose	Mapped	
Maine	Nat'l Park	3,935	-	63
Maine	State & Private	358,552	148,511	2,211
N. H.	State & Private	467,866	166,364	2,677
Vt.	State & Private	87,388	19,465	386
Mass.	State & Private	73,232	24,199	367
Conn.	State & Private	32,287	28,865	407
N. Y.	State & Private	495,434	172,365	2,760
Pa.	State & Private	147,444	10,026	598
Md.	State & Private	827	180	4
Va.	Nat'l Forest	73,686	1,665	326
Va.	State & Private	58,604	9,965	244
Va.	Nat'l Park	2,105	-	39
W. Va.	Nat'l Forest	21,713	82	68
W. Va.	State & Private	82,959	10,687	398
N. Car.	Nat'l Forest	3,481	109	12
N. Car.	State & Private	6,130	390	59
N. Car.	Nat'l Park	3,752	-	128
Tenn.	Nat'l Forest	100	-	1
Tenn.	State & Private	650	-	2
TOTALS	State & Private	1,811,373	591,017	10,113
	Nat'l Forest	98,980	1,856	407
	Nat'l Park	9,792	-	230
	ALL	1,920,145	592,873	10,750





TABLE 4

State National Forest National Park	First Work			Rework			Maintenance Work			All Work			Acres Per Man Day	Per Acre Values	
	Acres	Ribes	Man Days	Acres	Ribes	Man Days	Acres	Ribes*	Man Days	Acres	Ribes*	Man Days		Man Days	Ribes
Maine New Hampshire Vermont Massachusetts Connecticut New York Pennsylvania Maryland Virginia West Virginia North Carolina Tennessee	Ribes Eradication on S&P Lands														
	19,170	106,370	774	71,850	195,062	1,572	1,650	74,081	276	92,670	375,513	35.3	.028	4.1	
	1,175	5,668	20	80,171	216,266	1,244	2,660	62,505	101	84,006	284,439	61.5	.016	3.3	
	11,914	59,793	562	12,984	42,807	535	9,160	27,984	234	34,058	130,584	25.5	.039	3.8	
	691	194	5	6,930	20,802	336	267	12,555	34	7,888	33,551	21.0	.047	4.2	
	-	-	-	-	-	-	174	34,872	65	174	34,872	2.6	.373	200.4	
	15,400	154,809	838	64,981	364,358	2,714	24,873	256,242	1,134	105,254	775,409	22.4	.044	7.3	
	3,495	41,575	212	4,306	16,897	120	5,210	30,676	237	13,011	89,148	22.8	.043	6.8	
	180	5,066	32	747	58,262	178	-	-	-	927	63,328	4.4	.226	68.3	
	3,333	19,411	296	3,083	18,023	483	1,765	13,891	288	8,181	51,325	7.6	.130	6.2	
	-	-	-	15,678	66,161	1,981	2,093	2,683	153	17,771	68,844	8.3	.120	3.8	
	720	30,239	208	100	759	4	780	214	7	1,600	31,212	7.3	.136	19.5	
	-	-	-	10	396	1	8	26	1	18	422	9.0	.111	23.4	
Totals-State & Private	56,078	423,125	2,947	260,840	999,793	9,168	48,640	515,729	2,530	365,558	1,938,647	24.9	.040	5.3	
Monongahela- W. Va. Geo. Washington - W. Va. Geo. Washington - Va. Jefferson - Virginia North Carolian N.F.-N.C.	Ribes Eradication on National Forests														
	-	-	-	523	2,675	69	1,189	3,355	121	1,712	6,030	9.0	.111	3.5	
	-	-	-	552	2,769	94	75	165	11	627	2,934	6.0	.167	6.0	
	578	2,821	96	3,622	19,321	600	3,107	10,967	394	7,307	33,109	6.7	.149	6.7	
Acadia - Maine Shenandoah - Va. Great Smoky - N.C.	Ribes Eradication on National Parks														
	-	-	-	-	-	-	10	305	2	10	305	5.0	.200	30.0	
	-	-	-	-	-	-	25	50	3	25	50	8.3	.120	2.0	
	-	-	-	110	1,670	26	-	-	-	110	1,670	4.2	.023	15.1	
Totals-National Parks	-	-	-	110	1,670	26	35	355	5	145	2,025	4.7	.213	13.9	
Maine New Hampshire Vermont Massachusetts Connecticut New York Pennsylvania Maryland Virginia West Virginia North Carolina Tennessee	Ribes Eradication on All Lands														
	19,170	106,370	774	71,850	195,062	1,572	1,660	74,386	278	92,680	375,818	35.3	.028	4.0	
	1,175	5,668	20	80,171	216,266	1,244	2,660	62,505	101	84,006	284,439	61.5	.016	3.3	
	11,914	59,793	562	12,984	42,807	535	9,160	27,984	234	34,058	130,584	25.5	.039	3.8	
	691	194	5	6,930	20,802	336	267	12,555	34	7,888	33,551	21.0	.047	4.2	
	-	-	-	-	-	-	174	34,872	65	174	34,872	2.6	.373	200.4	
	15,400	154,809	838	64,981	364,358	2,714	24,873	256,242	1,134	105,254	775,409	22.4	.044	7.3	
	3,495	41,575	212	4,306	16,897	120	5,210	30,676	237	13,011	89,148	22.8	.043	6.8	
	180	5,066	32	747	58,262	178	-	-	-	927	63,328	4.4	.226	68.3	
	4,834	55,838	586	6,705	37,344	1,083	5,202	27,687	739	16,741	120,869	6.9	.143	7.2	
	-	-	-	16,753	71,605	2,144	3,357	6,203	285	20,110	77,808	8.3	.120	3.8	
	756	30,663	212	210	2,429	30	780	220	7	1,746	33,312	7.0	.140	19.0	
	-	-	-	10	396	1	8	26	1	18	422	9.0	.111	23.4	
Total	57,615	459,976	3,241	265,647	1,026,228	9,957	53,351	533,356	3,115	376,613	2,019,560	23.0	.043	5.3	

\* Including ribes destroyed on maintenance survey work.





Table 5 - Maintenance Activities During 1957

State	Ownership	Total Acreage Examined	Portion Requiring Intensive Control Measures					
			Number Acres Worked	Number * Ribes Destroyed	Man Days	Acres Per Man Days	Per Acre Values	
							Man Days	Ribes
Me.	State & Private	124,258	1,650	74,081	276	6.0	.167	44.9
Me.	Nat'l Park	3,935	10	305	2	5.0	.200	30.5
N. H.	State & Private	324,897	2,660	62,505	101	26.3	.037	23.4
Vt.	State & Private	21,978	9,160	27,984	234	39.1	.025	2.4
Mass.	State & Private	30,526	267	12,555	34	7.8	.127	28.9
Conn.	State & Private	32,287	174	34,872	65	2.7	.373	159.0
N. Y.	State & Private	159,990	24,873	256,242	1,134	21.9	.040	7.9
Pa.	State & Private	129,485	5,210	30,676	237	22.0	.045	5.8
W. Va.	State & Private	47,910	2,093	2,683	153	13.6	.073	1.2
W. Va.	Nat'l Forest	13,667	1,264	3,520	132	9.5	.104	2.7
Va.	State & Private	46,771	1,765	13,891	288	6.1	.163	7.8
Va.	Nat'l Forest	63,792	3,412	13,746	1,148	2.9	.336	4.0
Va.	Nat'l Park	2,105	25	50	3	8.3	.120	2.0
N.C.	State & Private	780	780	214	7	111.4	.008	0.3
N.C.	Nat'l Forest	100	-	6	-	-	-	-
Tenn.	State & Private	450	8	26	1	8.0	.125	3.2
Tenn.	Nat'l Forest	100	-	-	-	-	-	-
Total	State & Private	919,332	48,640	515,729	2,530	19.2	.052	10.6
"	Nat'l Forest	77,659	4,676	17,272	1,280	3.6	.273	3.7
"	Nat'l Park	6,040	35	355	5	7.0	.143	10.1
All		1,003,031	53,351	533,356	3,815	14.0	.071	10.0

\* Including ribes destroyed on maint. survey work.





TABLE 6

STATUS OF BLISTER RUST CONTROL WORK IN PRESENT NET CONTROL AREA IN THE EASTERN REGION BY STATES AND DISTRICTS - SEPTEMBER 30, 1957

State	District	Total Control Area	Acreage of White Pine	Net Acreage Worked		Acreage In			Control Area			Percentage Of	Net	Control		Area
				Initial	Maintenance	Now On Maintenance	Requiring No Further Work	Needing First Work	Rework	Maintenance	Initial	Worked Maintenance	On Maintenance	First Work	Rework	Maintenance
Maine	Bradbury	695,111	217,933	626,332	34,681	474,153	-	68,779	152,179	474,153	90.1	4.9	68.2	9.9	21.8	68.2
	Calderara Pike	759,239	308,539	736,191	4,109	598,750	19,981	23,048	137,441	578,769	96.9	.5	78.8	3.1	18.1	76.2
N. H.	Totals for State	762,464	392,487	762,164	13,865	680,148	87,407	-	82,316	592,741	100.0	1.8	89.2	-	10.7	77.7
	Boomer	2,216,814	918,959	2,124,987	52,655	1,753,051	107,388	91,827	371,936	1,645,663	95.8	2.3	79.0	4.2	16.7	74.2
Vt.	Codman	343,069	153,403	343,069	8,037	262,573	1,456	-	80,496	261,117	100.0	2.3	76.5	-	23.4	76.1
	Conner	571,618	270,576	571,216	22,982	481,410	-	402	89,806	481,410	99.9	4.0	84.2	.1	15.7	84.2
Mass.	Curtis	739,963	374,038	739,963	20,225	739,963	-	-	-	739,963	100.0	2.7	100.0	-	-	100.0
	Totals for State	837,936	430,731	837,936	8,276	740,092	289,631	-	97,844	450,461	100.0	.9	88.3	.1	11.6	53.7
R. I.	Palmer	2,492,586	1,228,748	2,492,184	59,520	2,221,038	291,087	402	268,146	1,932,951	99.9	2.4	89.2	.1	10.7	77.5
	Rose	278,869	67,737	246,003	43,342	185,760	-	32,866	60,243	185,760	88.3	15.5	66.6	11.7	21.6	66.6
Conn.	Totals for State	449,397	114,601	438,539	6,758	391,683	11,247	10,858	46,856	380,436	97.5	1.5	87.1	2.5	8.0	87.0
	Lilly	728,266	182,338	684,542	50,100	577,443	11,247	43,724	107,099	566,196	94.0	6.9	79.3	6.0	13.2	79.2
N. Y.	Totals for State	1,447,299	597,748	1,445,925	4,712	1,390,920	777,624	1,374	55,005	613,296	99.9	.3	96.1	.1	3.8	42.3
	Miller	147,778	64,018	147,778	104,440	147,778	147,778	-	-	-	100.0	70.7	100.0	-	-	-
N. J.	Barber	463,971	101,375	463,884	282,455	463,884	316,823	87	-	147,061	99.9	60.8	99.9	.1	-	33.1
	Charlton	657,172	169,537	655,762	200,648	573,439	8,573	1,410	82,323	564,866	99.8	30.5	87.2	.2	12.5	86.0
Penna.	Harpp	434,779	131,252	434,529	31,752	365,004	13,825	250	69,525	351,179	99.9	7.3	83.9	.1	15.9	80.8
	Hick	586,777	290,641	586,777	304,947	575,985	-	-	10,792	575,985	100.0	51.9	98.1	-	1.8	98.1
Del.	Holcomb	218,202	43,221	216,807	22,406	163,154	8,615	1,395	53,653	154,539	99.4	10.2	74.7	.6	24.5	70.8
	Western N. Y.	221,970	74,427	221,050	26,690	185,155	16,435	920	35,895	168,720	99.6	12.0	83.4	.4	16.1	76.0
Md.	Totals for State	137,525	26,060	126,058	12,643	61,944	845	11,467	64,114	61,099	91.6	9.1	45.0	8.4	46.6	44.4
	Totals for State	2,256,425	735,138	2,240,983	599,086	1,924,681	48,293	15,442	316,302	1,876,388	99.3	26.5	85.2	.7	14.0	83.1
W. Va.	Totals for State	16,742	3,771	16,742	-	16,742	16,742	-	-	-	100.0	-	100.0	-	-	-
	DeBerti	152,049	30,512	149,329	31,008	133,619	29,098	2,720	15,710	104,521	98.2	20.3	88.7	1.8	10.3	68.7
Va.	Fatzinger	318,904	75,017	317,752	46,753	309,838	17,412	1,152	7,914	292,426	99.6	14.6	97.1	0.4	2.4	91.6
	Totals for State	470,953	105,529	467,081	77,761	443,457	46,510	3,872	23,624	396,947	99.2	16.5	94.1	0.8	5.0	84.2
Ky.	Totals for State	6,186	242	6,186	-	6,186	6,186	-	-	-	100.0	-	100.0	-	-	-
	Keaton	165,046	70,884	165,046	-	152,444	54,553	-	12,602	97,891	100.0	-	92.3	-	7.6	59.3
Tenn.	Stegall	655,708	329,023	655,588	6,456	571,531	167,445	120	84,057	404,086	99.9	9.0	87.1	0.1	12.8	61.6
	Stegall	2,072,259	797,689	2,063,567	36,970	1,970,369	603,404	8,692	93,198	1,366,965	99.6	1.7	95.1	0.4	4.4	66.0
S. C.	Keaton	146,314	48,179	146,314	-	146,314	146,209	-	-	105	100.0	-	100.0	-	-	-
	Stegall	1,631,101	770,118	1,631,101	-	1,622,105	1,603,770	-	8,996	18,335	100.0	-	99.4	-	0.5	11.2
Ga.	Stegall	1,643,244	736,768	1,642,169	780	1,634,997	1,600,883	1,075	7,172	34,114	99.9	-	99.5	0.1	0.4	20.7
	Stegall	130,870	64,192	130,870	-	130,870	130,870	-	-	-	100.0	-	100.0	-	-	-
Grand Total	Stegall	674,355	544,478	674,355	-	674,015	674,015	-	340	-	100.0	-	99.9	-	-	-
	All States	17,365,917	7,299,197	17,199,302	1,274,935	15,850,825	6,750,827	166,615	1,348,477	9,099,998	99.0	7.3	91.3	0.9	7.8	52.4





TABLE 7

STATUS OF BLISTER RUST CONTROL BY STATES AND OWNERSHIP CLASSES, IN THE NET CONTROL AREA OF THE EASTERN REGION - SEPTEMBER 30, 1957

State	Land Ownership	Total Control Area	Acreage of White Pine	Net Acreage Worked		Acreage		In Net		Control Area			Of		Net Control		Area
				Initial Work	Mainten- ance	Now On Maintenance	Requiring No Further Work	Needing Further Attention		On Maintenance	Percentage	First Work	Further Attention	Rework	Maintenance		
Maine	State and Private	2,197,244	914,485	2,105,417	43,808	1,733,481	107,388	91,827	371,936	1,626,093	78.9	95.8	2.0	4.2	16.9	74.0	
N. H.	"	2,489,352	1,227,481	2,488,950	58,330	2,220,804	291,087	402	268,146	1,929,717	89.2	99.9	2.3	0.1	10.8	77.5	
Vt.	"	725,958	181,794	682,234	50,100	575,135	11,247	43,724	107,099	563,888	79.2	94.0	6.9	6.0	14.7	77.6	
Mass.	"	1,447,299	597,748	1,445,925	4,712	1,390,920	777,624	1,374	55,005	613,296	96.1	99.9	0.3	.1	3.8	42.3	
R. I.	"	117,778	64,018	117,778	104,440	147,778	316,823	87	-	-	100.0	100.0	70.7	-	-	-	
Conn.	"	463,971	101,375	463,884	282,455	463,884	48,293	15,229	316,302	1,47,061	99.9	99.9	60.8	0.1	-	31.7	
N. Y.	"	2,254,975	735,003	2,239,746	599,066	1,923,444	16,742	16,742	-	1,875,151	85.3	99.7	26.5	0.7	14.0	83.1	
N. J.	"	16,742	3,771	16,742	77,521	16,742	46,510	3,872	23,349	-	100.0	100.0	-	-	-	84.2	
Pa.	"	466,868	104,572	462,996	-	439,647	6,186	-	-	393,137	94.2	100.0	16.6	0.9	5.0	-	
Del.	"	6,186	242	6,186	-	6,186	54,553	-	12,602	97,891	92.4	100.0	-	0.1	7.6	59.3	
Md.	"	165,046	70,884	165,046	-	152,444	138,212	120	63,557	293,624	87.1	99.9	0.8	0.1	12.8	59.2	
W. Va.	"	495,513	239,262	495,393	4,047	431,836	559,348	8,059	49,489	881,039	96.1	99.5	0.8	0.5	3.3	58.8	
Va.	"	1,497,935	539,351	1,489,876	13,120	1,440,387	114,282	-	-	30	100.0	100.0	-	-	-	-	
Ky.	"	114,312	31,199	114,312	-	114,312	1,042,155	-	6,474	17,034	99.4	100.0	-	-	0.6	1.6	
Tenn.	"	1,065,663	465,679	1,065,663	8	1,059,189	1,361,790	1,025	3,944	2,971	99.6	99.9	-	0.1	0.3	0.2	
N. C.	"	1,369,730	582,952	1,368,705	780	1,364,761	77,008	-	-	-	100.0	100.0	-	-	-	-	
S. C.	"	77,008	45,398	77,008	-	77,008	324,302	-	150	-	99.9	100.0	-	-	-	-	
Ga.	"	324,452	248,576	324,452	-	324,452				-			-	-	-	-	
Sub-Total	State and Private	15,326,032	6,153,790	15,160,313	1,238,387	13,882,260	5,441,328	165,719	1,278,053	8,440,932	90.6	98.9	8.0	1.1	8.3	55.0	
Me. & N. H.	White Mountain	5,486	2,211	5,486	1,190	5,486	-	-	-	5,486	100.0	100.0	21.7	-	-	100.0	
Vt.	Green Mountain	2,308	544	2,308	-	2,308	-	-	-	2,308	100.0	100.0	-	-	-	100.0	
Pa.	Allegheny	4,085	957	4,085	240	3,810	-	-	275	3,810	93.2	100.0	0.6	-	.7	93.2	
W. Va.	Monongahela	88,822	47,570	88,822	2,056	79,380	24,607	-	9,442	54,773	89.3	100.0	2.3	-	10.6	61.6	
Va. & W. Va.	Geo. Washington	502,928	233,372	502,295	19,520	454,174	34,924	633	48,121	419,250	90.3	99.9	2.3	0.1	9.5	83.3	
Va.	Jefferson	126,719	63,662	126,719	3,613	121,510	13,758	-	5,209	107,752	95.8	100.0	3.9	-	4.1	85.0	
Ky.	Cumberland	32,002	16,980	32,002	-	32,002	31,927	-	-	75	100.0	100.0	2.8	-	-	-	
Tenn.	Cherokee	485,686	250,171	485,686	-	483,164	481,863	-	2,522	1,301	99.4	100.0	-	-	0.5	0.2	
N. Car.	National Forest	230,947	136,365	230,897	-	227,791	226,887	50	3,106	904	98.6	99.9	-	0.1	1.3	0.4	
S. Car.	Sumter	53,862	18,794	53,862	-	53,862	53,862	-	-	-	100.0	100.0	-	-	-	-	
Ga.	Chattahoochee	349,903	295,902	349,903	-	349,713	349,713	-	190	-	99.9	100.0	-	-	-	-	
Sub-Total	National Forests	1,882,748	1,066,558	1,882,065	26,619	1,813,200	1,217,541	683	68,865	595,659	96.3	99.9	1.4	0.1	3.6	31.6	
Me.	Acadia	17,318	3,500	17,318	8,847	17,318	-	-	-	17,318	100.0	100.0	51.0	-	-	100.0	
N. Y.	Saratoga Battlefield	1,450	135	1,237	20	1,237	-	213	-	1,237	85.3	85.3	-	14.7	-	85.3	
Va.	Shenandoah	14,270	3,080	14,270	1,070	14,270	-	-	-	14,270	100.0	100.0	7.5	-	-	100.0	
Va. & N.Car.	Blue Ridge	13,663	6,042	13,663	-	12,104	11,761	-	1,559	343	88.5	100.0	-	-	11.4	2.5	
N.C.& Tenn.	Great Smoky	109,991	66,070	109,991	-	109,991	79,752	-	-	30,239	100.0	100.0	-	-	-	27.5	
Sub-Total	National Parks	156,692	78,827	156,479	9,937	154,920	91,513	213	1,559	63,407	98.8	99.9	6.3	0.1	1.0	40.4	
Cherokee	Indian Lands	445	22	445	-	445	445	-	-	-	100.0	100.0	-	-	-	-	
Grand Total	All Ownerships	17,365,917	7,299,197	17,199,302	1,274,943	15,950,825	6,750,827	166,615	1,348,477	9,099,998	91.3	99.0	7.3	0.9	7.8	52.4	





**TABLE 8 — TOTAL FEDERAL, STATE AND LOCAL EXPENDITURES FOR  
ALL BLISTER RUST CONTROL ACTIVITIES DURING 1957**

STATE	F E D E R A L				STATE AND LOCAL COOPERATION	GRAND TOTAL
	FOREST SERVICE			NATIONAL PARKS		
	LEADER- SHIP	WORK ON S&P LANDS	WORK ON NATIONAL FORESTS			
ME.	\$ 30,504	\$ 26,584	\$ —	\$ 908	\$ 44,553	\$ 102,549
N. H.	37,443	38,605	—	—	54,337	130,385
VT.	18,755	11,581	—	—	14,625	44,961
MASS.	9,913	3,785	—	—	11,965	25,663
CONN.	1,635	981	—	—	12,154	14,770
N. Y.	51,239	26,483	—	—	156,691	234,413
PA.	19,868	4,501	—	—	22,719	47,088
MD.	630	628	—	—	2,388	3,646
VA.	18,670	7,999	29,000	2,110	12,166	69,945
W. VA.	18,486	14,707	5,302	—	27,587	66,082
N. CAR.	1,093	648	1,247	2,998	5,250	11,236
TENN.	769	100	—	—	1,400	2,269
TOTAL	\$ 209,005	\$ 136,602	\$ 35,549	\$ 6,016	\$365,835	\$ 753,007

REGIONAL OFFICE COSTS ARE INCLUDED IN THE ABOVE AND PRORATED BY STATES.

**TABLE 9 — BREAKDOWN OF STATE AND LOCAL COOPERATIVE EXPENDITURES  
AND CONTRIBUTED SERVICES DURING 1957**

STATE	C A S H E X P E N D I T U R E S					V A L U E O F C O N T R I B U T E D S E R V I C E S		STATE I N D I R E C T A I D	T O T A L
	STATE	T O W N S	C O U N T I E S	I N D I V I D - U A L S	S U B - T O T A L	STATE	C O U N T Y T O W N I N D I V I D .		
ME. .	\$ 23,973	\$ 18,555	\$ —	\$ —	\$ 42,528	\$ 1,025	\$ —	\$ 1,000	\$ 44,553
N. H.	31,090	21,923	—	—	53,013	844	—	480	54,337
VT.	6,816	5,101	—	99	12,016	959	—	1,650	14,625
MASS.	9,515	560	—	—	10,075	1,000	—	890	11,965
CONN.	10,438	1,416	—	—	11,854	—	—	300	12,154
N. Y.	123,261	—	20,604	842	144,707	5,959	—	6,025	156,691
PA.	18,999	—	—	—	18,999	1,080	—	2,640	22,719
MD.	2,061	—	—	—	2,061	177	—	150	2,388
VA.	10,278	—	—	—	10,278	363	—	1,525	12,166
W. VA.	25,525	—	—	—	25,525	1,462	—	600	27,587
N. CAR.	4,750	—	—	—	4,750	—	—	500	5,250
TENN.	1,400	—	—	—	1,400	—	—	—	1,400
TOTAL	\$268,106	\$ 47,555	\$ 20,604	\$ 941	\$337,206	\$12,869	—	\$ 15,760	\$365,835



UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

Region 9

ANNUAL REPORT

FOREST PEST CONTROL

NORTH CENTRAL REGION

CALENDAR YEAR 1957

Division of State & Private Forestry  
Forest Pest Control Section  
In Cooperation With  
Federal, State, County and Local Agencies



Milwaukee, Wisconsin  
February, 1958





## ANNUAL REPORT

### FOREST PEST CONTROL, NORTH CENTRAL REGION

CALENDAR YEAR - 1957

#### ORGANIZATION

The Forest Pest Control Section now consists of two branches: Forest Insect Control, headed by Mr. Kroeber, and Forest Disease Control, headed by Mr. Adams, who transferred from Region 5. One other organizational change was the assignment of Mr. Doerner, formerly with the Central States Experiment Station, as Area Leader for Wisconsin and Illinois. The accompanying chart shows the entire Forest Pest Control organization as it existed during most of 1957.

#### RESPONSIBILITY

The Section is concerned with cooperative forest pest control work. Under the Lea Act of 1940 and state laws, the Section is responsible for leadership, coordination and technical direction of the blister rust control program on lands of all ownerships. Under the Forest Pest Control Act of 1947 the Section carries out federal responsibilities in cooperation with the states for work on state and private lands. The function of the Section is to help create awareness of forest pest problems, and to coordinate and expedite control measures where more than one state or agency are involved. All control work is done under authority of state laws under the direction of the state agency responsible. The Forest Pest Control Act provides for federal financial participation in cooperative forest pest control work when states request it. It is the responsibility of the Section to ascertain the biological and economic aspects of proposed projects by consulting with Forest Experiment Stations and forest managers, submitting project proposals requesting financial aid, drawing up cooperative agreements with the states, assisting them in preparing work plans, and rendering such assistance in the field and elsewhere to assure the successful operation of control projects.

#### SPREAD OF MAJOR FOREST PESTS IN 1957

White pine blister rust, a two-host parasitic fungus-caused disease was introduced from Europe about 1900. The disease is now widespread throughout the Region, ranging from very heavy infection in the north to very light in the south. However, no new pine infection was reported this year. Blister rust attacks and kills white pines. Damage is particularly severe on young growth, thus threatening the future stands of eastern white pine. The rust is controlled by the destruction of currant and gooseberry bushes (ribes), the alternate hosts for the disease.





Jack pine budworm damage was again severe in northwestern Wisconsin and central Minnesota. Spruce budworm was present and spreading in northern Minnesota near the Canadian border. Larch sawfly damage is increasing in the north, especially in Minnesota. Saratoga spittlebug continued to be present in plantations of jack and red pine in the three Lake States. European pine shoot moth was particularly severe in red pine plantations in lower Michigan, northern Ohio, northern Indiana and southeastern Wisconsin. The tip weevil continued to be damaging, especially in open grown plantations of white, jack, red pine and norway spruce in the northern parts of Minnesota, Wisconsin and Michigan. It is scarce or absent in the southern part of the Region. The weevil is not severe on white pines growing under a high deciduous overstory of 40% or more density.

Oak wilt is increasing in intensity and is killing oaks, especially the red oak group. Dutch elm disease continues to spread throughout southeastern Wisconsin. To date more than 400 diseased elms have been found and destroyed. Maple blight, a disease of unknown cause and behavior, is killing hard maple of all age classes in northeastern Wisconsin. Research work is underway to determine the cause and to provide control measures.

#### ACCOMPLISHMENTS - 1957

The Section's main accomplishments were in the field of white pine blister rust control. However, work on the control of other forest pests was begun this year.

#### WHITE PINE BLISTER RUST CONTROL

Control activities were conducted in the three Lake States and in Illinois and Iowa. No work was needed in Indiana and Ohio where the rust hazard is low.

#### Surveys

As a result of surveys, both pre-eradication and post-check, the control problem in 1957 was increased by the addition of 10,467 acres of white pine, chiefly as natural reproduction in Michigan and Wisconsin. (Table 1.) Survey work was done principally by the permanent staff before and after the ribes eradication season.

A new method of conducting white pine surveys was developed last winter in Lower Michigan by Area Leader Nelson. A helicopter, made available by the Coast Guard at no cost to the Forest Service, was used in scouting white pine areas. Seed trees and reproduction were successfully spotted and mapped. About 800,000 acres were examined during 11.7 hours of actual flight time.



## Local Control

About 35,000 acres of white pine were protected by destroying two million ribes on 74,000 acres of control area at the expense of 13,700 man-days. (Table 2).

Force account labor was used on most of the projects. Prison trustees worked effectively on state and private land in Michigan and Minnesota. Contract eradication was used exclusively on three national forests in Michigan, and was introduced this year in Minnesota on the Superior National Forest. One small contract eradication job was completed on private land in Wisconsin. This year 10,044 acres were worked by contractors compared to 4,869 acres in 1956. The average cost was \$1.03 per acre.

The use of 2,4,5-T again accounted for the destruction of ribes in heavy concentrations and in swamp areas. All work in Illinois was done by basal stem spraying of 2,4,5-T in oil. Application of 2,4,5-T in water as a foliage spray was made in Michigan, Minnesota and Wisconsin. Power spray equipment was again used to destroy swamp ribes on the Menominee Indian Reservation.

## Checking

Checking for ribes after eradication showed that satisfactory work was done on the 65,102 acres checked. (Table 2).

## Canker Pruning

Cankers were removed to save 4,202 infected pines growing in protected stands, and 1,395 fatally infected pines were removed in Iowa, Michigan, Minnesota and Wisconsin. (Table 5).

## Nursery Sanitation

Ribes were removed from around five state-owned nurseries, all in Wisconsin. (Table 6). Ribes-free conditions are being maintained around 42 nurseries producing about 35 million white pine annually in the Region.

## Status of Control

The total control problem in the Region consists of 1,290,233 acres of white pine, and 3,763,354 acres of control area. This is a slight increase over 1956. (Table 4). At year's end 86% of the Regional control area has been initially worked, and 47% is on maintenance.

The major problem of control is in Michigan, Wisconsin and Minnesota. Nearly all of the natural white pine, and much of the planted are in these States, and the rust is most active and prevalent here. In Ohio, Indiana and Illinois white pine is extensively planted and grows well,





often 4 feet in height per year. Due largely to hot, dry summers and early fall, rust is inhibited, and the danger of rust damage is much less than further north. The biggest problem of control in the three Lake States is in Minnesota, with only 71% initially worked, and 23% on maintenance, compared with about 89% initially worked, and 47% on maintenance in Wisconsin and Michigan. In general, ribes are more abundant and eradication costs are higher in Minnesota than elsewhere in the Region. Weather conditions in northeastern Minnesota are very favorable for rust development.

On the basis of ownership classes, control work is fairly well on schedule on national forests, and Indian Reservations, but lags on state and county lands, and is far behind on private lands. This is important, because of the total control acreage 62% is private, 25% state, county and municipal, 9% is in national forests, and 4% is in Indian Reservations. (Table 4).

### Work Plans

Long-range work plans for national forests, Indian Reservations, and some state forests have been prepared and are being followed. Long-range plans for other state and private lands are being prepared. These plans are valuable as a basis for advising owners, and for the orderly planning of future control activities.

### Personnel Employed by Months

Of the 87.6 man-years of work, 39.7 man-years were employed on state and private funds, indicating the strong cooperative nature of the blister rust control project. (Table 7). Practically 83% of the total man-months is used for ribes eradication during the growing season, and only 17% is used the remainder of the year. During the fall and winter months the small nucleus of year-round personnel makes pre-eradication and post-check surveys, brings control records up to date, contacts pine owners, writes reports, and prepares work plans for the ensuing eradication season.

### Costs

Total funds for blister rust control in 1957 were greater than in 1956, due primarily to increased state and private participation. State and local contributions were \$148,549, the highest to date. (Table 8).

### Safety

Instruction in safe working practices is a standard part of the field training program. First aid kits are supplied to each field crew and are carried in each government vehicle.

### Recommendations

It is recommended that:

1. Continued effort be made to interest private owners of valuable white pines to protect them against blister rust as a necessary part of white pine management.





2. Close ties with Farm and Service Foresters be established and maintained so they will be familiar with blister rust and other major forest pest control measures, and will encourage private forest owners to practice necessary forest protection.
3. Cooperative relations be maintained with other branches of the Forest Service for mutual assistance in state and private forestry. This is of special importance in view of impetus for planting and forest management in A.C.P. and Soil Bank activities.
4. Forest Pest Control personnel continue to learn more of major forest pests and their control so they may be of greater use in developing and operating cooperative forest pest control projects.
5. Forest Pest Control personnel work closely with and assist investigation units dealing with the development of resistant strains of white pine, micro-climate studies of the rust and the application of improved herbicides to destroy ribes.
6. Men be trained and encouraged to take ribes eradication contracts.
7. Grades for District Leaders be adjusted, and funds be provided for needed full-time assistants to enable District Leaders to carry out their increased job load under their added responsibilities of forest pest control.
8. Long-range work plans be revised and maintained for all national forests, Indian Reservations, state (and county) forests and state (and county) parks.
9. More intensive disease and stocking survey work be done to determine the behavior of the rust on certain problem areas.
10. More intensive checking procedures be used, particularly on post check and on regular check following contract eradication work.
11. National forest personnel be trained in control procedures and encouraged to assume an active part in the program.
12. Safety measures continue to be stressed to accomplish the goal of no accidents.

#### INFORMATIONAL ACTIVITIES

It is the responsibility of this Section to keep the public informed about blister rust and other forest pest control. Several radio appearances, talks before forestry classes, newspaper articles, blister rust control movies, show-me trips, and meetings were conducted during 1957. Many personal contacts were made by regular personnel in connection with survey work, and the development of concerted community effort in control work. The major effort is aimed at helping the pine owner help himself.



A leaflet entitled "Selection and Treatment of White Pine Planting Sites to Guard Against Blister Rust Damage in Iowa and Minnesota" was prepared by Area Leader Ritter and distributed to many prospective pine planters. Owners are being encouraged to plant white pine in areas where the rust hazard is low and tip weevil is absent.

#### ECONOMIC STUDY OF WHITE PINE

The field work on the economic study of eastern white pine started last year was completed by the Area and District Leaders. Site and stocking data were taken on 549 sample plots selected at random. Results of this study should furnish valuable data for evaluating the marginal pine units within the control area.

#### BRC ORGANIZATION STUDY

A two-man committee from the Regional Office made an exhaustive study of the blister rust control organization. Particular attention was given to the District Leader positions. All field men were interviewed and a detailed analysis was made of their activities. Results of this study will be used to set up the future pattern of the Section's operating procedure.

#### RESEARCH STUDIES

The study of micro-climate in relation to blister rust behavior was continued by Dr. Van Arsdel.

Work on the development of rust resistant white pines was continued. Field personnel are constantly on the lookout for rust resistant pines growing in native stands.

#### BLISTER RUST CONTROL ON NATIONAL FORESTS

##### Organization of Work

The organization remained the same in 1957 as in previous years. National forest personnel were responsible for selection of white pine stands to be protected, and for furnishing labor and crew leaders. The F.P.C. Section, through District Leaders, directly trained and supervised control work on all forests except the Superior, where the Forest operated a camp. Responsibility for preparing work plans and maps, training men, checking on adequacy of work, maintaining records and preparing reports, remained with the Forest Pest Control Section. Close cooperation between the national forests and this Section continued.





## Accomplishments

Ribes eradication work was done on all national forests in the three Lake States. Approximately one-half of the work done was rework; amounts of initial and maintenance work were about equal. About 500,000 ribes were destroyed at the expense of 3,750 man-days.

This year marked the beginning of contract eradication on the Superior National Forest where work in remote areas could not be done from the Region's only BRC camp. Contract work continued effectively on the Huron, Manistee and Marquette National Forests. Of the 24,466 acres worked this year, 41% was done by contractors at the average price of \$1.01 per acre. (Table 3).

Pre-eradication survey and post-check work was done on all forests in the Lake States. About 4,100 acres were added to the control area. (Table 1).

In protected pine stands within the national forests 2,470 blister rust cankers were removed from 1,020 trees. (Table 5).

## Status of Control

Of the 357,457 acres in the control area 95% has been worked initially and 70% is now on maintenance. (Table 4). The work on the Superior continues to be the major control problem. There the inaccessibility of work areas, high costs of wages and camp operation, heavy concentrations of ribes and extremely favorable rust development conditions combine to make control work costly and difficult. Damage and stocking survey data will be taken next spring to aid in the possible elimination of certain (1) areas of marginal pine value, and (2) areas where climatic and pathologic conditions make adequate control work economically unjustifiable.

## BLISTER RUST CONTROL ON INDIAN RESERVATIONS

### Organization of Work

The Indian Service is responsible for the selection of areas to be protected and the employment of Indian labor and crew leaders. The Forest Service, through the Forest Pest Control Section, has the responsibility of preparing work plans and maps, training of men, checking on adequacy of work, keeping records, and making periodic reports.

### Accomplishments

The work on the Menominee was all pre-maintenance; only rework was done on the Red Lake and only maintenance work was done on the Nett Lake and Lac Court Oreilles Reservations. Indian labor was used on all reservations. (Table 3).





Chemical work by power sprayer was continued on the Menominee Reservation where 2,4,5-T was applied at the rate of 1.2 ounces per gallon of water. The spray crew was composed of three Indian women who demonstrated an exceptional aptitude for this method of work. The percent of kill will not be known until next season but results, based on last year's performance, are expected to be highly satisfactory.

Pre-eradication survey and post-check work resulted in an addition of 500 acres to the total control area. (Table 1).

#### Status of Control

Of the 141,520 acres of control area 97% has been worked initially and 80% is now on maintenance. (Table 4). Most of the pre-maintenance work remaining is on the Menominee, Lac Court Oreilles and Red Lake Reservations. Individual reports and work plans, in detail, have been prepared and furnished each Reservation concerned.

#### OTHER FOREST PEST CONTROL WORK

The first cooperative insect control project on state and private lands in this Region was successfully planned and completed. It was conducted by the State of Wisconsin to control the jack pine budworm. About 30,000 acres of jack pine were aerially sprayed at a cost of about \$71,000; the federal government's share was \$17,800. A similar cooperative project for control of the budworm was planned with Minnesota, but biological factors caused the infestation to subside and control work was unnecessary.

The Forest Pest Control Section maintained close contact with the states, the Region and the two Forest Experiment Stations to keep abreast of insect and disease conditions.



UNITED STATES FOREST SERVICE  
Regional Office Milwaukee, Wisconsin  
A. W. GREELEY - Regional Forester

STATE DEPARTMENTS  
of  
AGRICULTURE AND  
CONSERVATION

Division of State & Private Forestry  
J. K. VESSEY - Chief  
Forest Pest Control Section  
Henry N. Putnam - Leader  
John K. Kroeber-Assst. Leader, Forest Insect Control  
S. Daryl Adams -Assst. Leader, Forest Disease Control

UNITED STATES  
INDIAN SERVICE

AREA I  
MINNESOTA  
St. Paul  
L. B. Ritter - Area Leader  
Clerk-Steno. - W. A. E. Bragg

Walker, Minn.  
J. W. Lick -  
Dist. Leader  
Stanley Bilbo  
Control Aid

IOWA  
Oswego  
H. G. Hayes -  
Control Supervisor

Duluth, Minn.  
R. W. Nelson -  
Dist. Leader

ILLINOIS  
Belvidere  
E. D. Bergeson -  
Control Supervisor (A)

AREA II  
WISCONSIN  
Madison  
R. G. Doerner - Area Leader  
H. F. Williams - Field  
Supervisor (A)  
Clerk-Steno. - 1 1/2 Time

Cable, Wis.  
A. W. Depta -  
Dist. Leader

INDIANA  
Indianapolis  
No Control Supervisor  
Assigned

AREA III  
MICHIGAN  
Lansing  
L. E. Nelson - Area Leader  
Clerk-Steno. - Shared  
With State Dept. of Agri.

Escanaba, Mich.  
S. M. Sager -  
Dist. Leader

OHIO  
Columbus  
No Control Supervisor  
Assigned

Traverse City, Mich.  
A. J. Vorville  
Field Supvr. (A)  
Wm. H. Munyon -  
Control Aid

(A) - Employed on State Funds





## NORTH CENTRAL REGION

ESTIMATED COMMERCIAL VALUE OF WHITE PINE IN CONTROL AREA - \$519,666,000

## LOCAL CONTROL - 1957

Operating Agency	Acres Worked				Total Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Rework	Maint. Work	Total			Ribes	Man-Days
State-Coop.	16,110	24,886	5,758	46,754	1,519,984	8,451	33	0.18
Nat. Forests	6,518	11,032	6,916	24,466	497,613	3,750	20	0.15
Ind. Service	460	1,316	705	2,481	153,731	1,495	62	0.60
Total	23,088	37,234	13,379	73,701	2,171,328	13,696	29	0.19

## STATUS OF CONTROL (Net)

Item	National Forests	Ind. Reserv.	Non-Fed. Public	Private	Total
W.P. in Control Area, Acres	176,561	84,348	381,322	648,002	1,290,233
Total Control Area, Acres	357,457	141,520	953,166	2,311,211	3,763,354
Percent Worked Initially	95.1	96.7	90.0	82.8	86.3
Percent on Maintenance	69.6	79.8	45.6	41.3	46.6
Needing Initial Work, Acres	17,552	4,640	96,372	398,644	517,208
Needing Rework, Acres	90,928	23,947	422,515	953,703	1,491,093
Needing Maintenance Work, Acres	248,977	112,933	434,279	958,864	1,755,053

Blister Rust Infection, 1957: No new infection reported in 1957.

Cumulative: On pines and ribes in all seven states. Most severe in north. Rust found on pines in 208 counties; on ribes in 398 counties of the 622 counties in the seven states in the region.

Nursery Sanitation, 1957: 5 state nurseries worked, all in Wisconsin.

Ribes free zones maintained around 42 nurseries producing about 35,000,000 white pine trees annually.

Canker Pruning, 1957: 6,631 cankers removed to save 4,202 infected trees; 1,395 fatally infected trees were removed. Canker pruning was done in Iowa, Michigan, Minnesota and Wisconsin.

Surveying, 1957: 24,137 acres control area initially surveyed; 62,502 acres post-checked and increased to 64,146 acres. White pine in regional control area was increased this year by 10,467 acres.





# SUMMARY OF WHITE PINE BLISTER RUST CONTROL - DECEMBER 31, 1957

## ILLINOIS

ESTIMATED COMMERCIAL VALUE OF WHITE PINE IN CONTROL AREA - \$2,000,000

### LOCAL CONTROL - 1957

Operating Agency	Acres Worked			Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Rework	Total			Ribes	Man-Days
State-Coop.	508	830	1,338	39,856	50	29	0.06

### STATUS OF CONTROL (Net)

Item	Non-Federal		Private	Total
	Public			
W.P. in Control Area, Acres	1,672		1,095	2,767
Total Control Area, Acres	7,761		5,896	13,657
Percent Worked Initially	98.7		91.4	95.6
Percent on Maintenance	31.9		25.0	28.9
Needing Initial Work, Acres	98		505	603
Needing Rework, Acres	5,187		3,912	9,099
Needing Maintenance Work, Acres	2,476		1,479	3,955

Blister Rust Infection, 1957: 696,650 white pine were inspected for rust in 22 counties. No new locations of rust were found during 1957.

Cumulative: On white pine in 15 counties, on ribes (currants and gooseberries) in 30 counties.

Nursery Sanitation, 1957: None. Cumulative: Ribes-free zones maintained around 2 nurseries.

Surveying, 1957: Pre-eradication on 475 acres; post-check on 131 acres.

Checking After Eradication, 1957: Less than 15 F.L.S. left per acre, except part of one area containing 29 acres.

Educational Work: Bulletins, letters and cards were mailed to approximately 830 white pine planters. Personal contacts and field demonstrations were given to about 200 white pine planters who requested technical help or advice on control work. 706 acres of white pine and 4,335 acres of control area were inspected for these planters.



# SUMMARY OF WHITE PINE BLISTER RUST CONTROL - DECEMBER 31, 1957

## INDIANA

ESTIMATED COMMERCIAL VALUE OF WHITE PINE IN CONTROL AREA = \$7,000,000

### LOCAL CONTROL, 1957 - NONE PERFORMED

STATUS OF CONTROL (Net)				
Item	National Forests	Non-Federal Public	Private	Total
W.P. in Control Area, Acres	18	3,169	7,560	10,747
Total Control Area, Acres	179	18,209	74,196	92,584
Percent Worked Initially	100.0	95.1	83.5	85.9
Percent on Maintenance	100.0	86.3	68.8	72.3
Needing Initial Work, Acres	-	887	12,213	13,100
Needing Rework, Acres	-	1,599	10,970	12,569
Needing Maintenance Work, Acres	179	15,723	51,013	66,915

Blister Rust Infection, 1957: No new counties. Cumulative: On white pine in 3 northern counties; on ribes in 53 of the 92 counties in the State.

Nursery Sanitation, 1957: None. Cumulative: Ribes-free zones maintained around 3 nurseries.





## SUMMARY OF WHITE PINE BLISTER RUST CONTROL - DECEMBER 31, 1957

## IOWA

ESTIMATED COMMERCIAL VALUE OF WHITE PINE IN CONTROL AREA - \$5,000,000

## LOCAL CONTROL, 1957

Operating Agency	Acres Worked			Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Rework	Total			Ribes	Man-Days
State-Coop.	-	230	230	17,036	144	74	0.63

## STATUS OF CONTROL (Net)

Item	Indian Reserv.	Non-Federal Public	Private	Total
W.P. in Control Area, Acres	50	627	2,485	3,162
Total Control Area, Acres	500	3,818	10,551	14,869
Percent Worked Initially	100.0	99.5	63.2	73.7
Percent on Maintenance	41.2	5.2	19.5	16.5
Needing Initial Work, Acres	0	20	3,887	3,907
Needing Rework, Acres	294	3,599	4,609	8,502
Needing Maintenance Work, Acres	206	199	2,055	2,460

Blister Rust Infection, 1957: Cumulative: On white pine in 12 counties in northeastern Iowa; on ribes in 56 of 99 counties in the State.

Nursery Sanitation, 1957: None. Cumulative: Ribes-free zones maintained around 7 nurseries.

Canker Pruning, 1957: 13 cankers removed to save 7 trees; 2 fatally infected trees removed.

Surveying, 1957: 230 acres control area post-checked and all retained.





# SUMMARY OF WHITE PINE BLISTER RUST CONTROL - DECEMBER 31, 1957

## MICHIGAN

ESTIMATED COMMERCIAL VALUE OF WHITE PINE IN CONTROL AREA - \$174,266,000

### LOCAL CONTROL - 1957

Operating Agency	Acres Worked				Total Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Rework	Maint. Work	Total			Ribes	Man-Days
State-Coop.	8,072	18,478	4,610	31,160	373,320	3,210	12	0.11
Nat. Forests	3,417	5,970	4,621	14,008	113,590	855	8	0.06
Ind. Service	-	-	-	-	-	-	-	-
<b>Total</b>	<b>11,489</b>	<b>24,448</b>	<b>9,231</b>	<b>45,168</b>	<b>486,910</b>	<b>4,065</b>	<b>11</b>	<b>0.09</b>

### STATUS OF CONTROL (Net)

Item	National Forests	Non-Federal Public	Private	Total
W.P. in Control Area, Acres	81,706	154,085	228,919	464,710
Total Control Area, Acres	200,724	340,033	742,450	1,283,207
Percent Worked Initially	97.7	93.0	85.4	89.3
Percent on Maintenance	77.1	52.6	35.1	46.3
Needing Initial Work, Acres	4,661	23,673	108,212	136,546
Needing Rework, Acres	41,220	137,650	373,303	552,173
Needing Maintenance Work, Acres	154,843	178,710	260,935	594,488

Blister Rust Infection, 1957: No new counties. Cumulative: On pines in 55 counties; on ribes in all 83 counties in the state.

Nursery Sanitation, 1957: None. Cumulative: Ribes-free zones maintained around 9 nurseries.

Canker Pruning, 1957: 1,900 cankers removed to save 630 trees; 450 fatally infected trees removed.

Surveying, 1957: 16,822 acres control area initially surveyed; 31,668 acres post-checked, and increased to 32,057 acres. Total control area increased by 17,141 acres.

Checking After Eradication, 1957: 43,528 acres checked for ribes after eradication, and all found satisfactory.



# SUMMARY OF WHITE PINE BLISTER RUST CONTROL - OCTOBER 31, 1957

## MINNESOTA

ESTIMATED COMMERCIAL VALUE OF WHITE PINE IN CONTROL AREA - \$40,500,000

### LOCAL CONTROL - 1957

Operating Agency	Acres Worked			Total Ribes Destroyed	Man- Days Used	Per Acre	
	Initial	Rework	Maint. Work			Ribes	Man Days
State-Coop.	236	1,526	-	1,762	328,636	1,612	187
Nat. Forests	755	2,817	-	3,572	212,950	1,771	60
Ind. Service	-	656	175	831	28,993	443	35
<b>Total</b>	<b>991</b>	<b>4,999</b>	<b>175</b>	<b>6,165</b>	<b>570,579</b>	<b>3,826</b>	<b>93</b>

### STATUS OF CONTROL (Net)

Item	National Forests	Ind. Reserv.	Non-Fed. Public	Private	Total
W.P. in Control Areas, Acres	47,196	20,791	58,072	106,245	232,304
Total Control Area, Acres	70,822	30,899	118,945	309,181	529,847
Percent Worked Initially	85.1	97.2	58.7	70.5	71.4
Percent on Maintenance	45.7	74.3	17.3	15.3	23.2
Needing Initial Work, Acres	10,548	851	49,067	91,229	151,695
Needing Rework, Acres	27,908	7,082	49,248	170,755	254,993
Needing Maintenance Work, Acres	32,366	22,966	20,630	47,197	123,159

Blister Rust Infection, 1957: No new counties. Cumulative: On pines in 41 counties, on ribes in 40 of the 87 counties in the State. Rust prevalent in all pine-growing counties, especially severe in northeastern Minnesota.

Nursery Sanitation, 1957: None. Cumulative: Ribes-free zones maintained around two nurseries.

Canker Pruning, 1957: 227 cankers removed to save 179 trees; 181 fatally infected trees removed.

Surveying, 1957: 547 acres of control were initially surveyed. 8,475 acres post-checked, of which 8,021 acres were retained.

Checking After Eradication, 1957: 5,465 acres of the 6,165 acres worked and checked after eradication. 5,359 acres supported less than 15 feet of ribes live stem on the average acre after eradication.

Control Area Permits, 1957: 65 applications for currant and gooseberry planting permits received, 53 permits issued, 11 requests voluntarily cancelled, 1 refused.





SUMMARY OF WHITE PINE BLISTER RUST CONTROL - DECEMBER 31, 1957

OHIO

ESTIMATED COMMERCIAL VALUE OF WHITE PINE IN CONTROL AREA - \$14,000,000

LOCAL CONTROL - 1957 - NONE PERFORMED

STATUS OF CONTROL (Net)

Item	National Forests	Non-Federal Public	Private	Total
W.P. in Control Area, Acres	515	8,787	13,414	22,716
Total Control Area, Acres	4,029	33,693	97,974	135,696
Percent Worked Initially	100.0	87.7	94.7	93.1
Percent on Maintenance	100.0	63.6	84.6	79.9
Needing Initial Work, Acres	0	4,131	5,201	9,332
Needing Rework, Acres	0	8,125	9,882	18,007
Needing Maintenance Work, Acres	4,029	21,437	82,891	108,357

Blister Rust Infection, 1957: No new counties. Cumulative: On pines in 11 counties; on ribes in 65 of the 88 counties in the State.

Nursery Sanitation, 1957: None. Cumulative: Ribes-free zones maintained around 7 nurseries.





## SUMMARY OF WHITE PINE BLISTER RUST CONTROL - DECEMBER 31, 1957

## WISCONSIN

ESTIMATED COMMERCIAL VALUE OF WHITE PINE IN CONTROL AREA - \$276,900,000

## LOCAL CONTROL - 1957

Operating Agency	Acres Worked				Total Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Rework	Maint. Work	Total			Ribes	Man-Days
State-Coop.	7,294	3,822	1,148	12,264	761,136	3,435	62	0.28
Nat. Forests	2,346	2,245	2,295	6,886	171,073	1,124	25	0.16
Ind. Service	460	660	530	1,650	124,738	1,052	76	0.64
Total	10,100	6,727	3,973	20,800	1,056,947	5,611	51	0.27

## STATUS OF CONTROL (Net)

Item	National Forests	Ind. Reserv.	Non-Fed. Public	Private	Total
W.P. in Control Area, Acres	47,126	63,507	154,910	288,284	553,827
Total Control Area, Acres	81,703	110,121	430,707	1,070,963	1,693,494
Percent Worked Initially	96.8	96.6	95.7	83.4	88.1
Percent on Maintenance	70.5	81.5	45.3	47.9	50.5
Needing Initial Work, Acres	2,343	3,789	18,496	177,397	202,025
Needing Rework, Acres	21,800	16,571	217,107	380,272	635,750
Needing Maintenance Work, Acres	57,560	89,761	195,104	513,294	855,719

Blister Rust Infection, 1957: Pine infection of 1954 origin easily recognized and fairly abundant. Cumulative: Rust on both white pine and ribes has been found in all 71 counties.

Nursery Sanitation, 1957: 5 nurseries were worked: Boscobel, Gordon, Griffith, Hayward and Hugo Sauer. Cumulative: Sanitation zones are maintained at 12 nurseries producing about 20,000,000 white pines.

Canker Pruning, 1957: Six areas were treated, 40,623 trees examined, 762 trees removed and 4,491 cankers pruned.

Surveying, 1957: Pre-eradication: 1,399 acres of white pine and 6,293 acres of control area. Post-check: 8,447 acres of white pine and 23,707 acres of control area.

Checking After Eradication, 1957: 14,553 acres were checked for ribes and all work was found satisfactory.

Control Area Permits, 1957: 284 applications were received and approval was given to 271, two were cancelled, nine were refused, one was from out-of-state, and one is pending.



TABLE 1

## SURVEYS PERFORMED IN NORTH CENTRAL REGION

Calendar Year 1957

State	Type of Survey	No. of Areas Mapped	Acres Mapped Previously		Total Acres Mapped, Net		New Days Used
			White Pine	Control Area	White Pine	Control Area	
Illinois	Pre-eradication	10	-	-	145	475	13
	Post-Check	1	8	21	36	131	3
	Total	11	8	21	181	606	12
Iowa	Pre-eradication	-	-	-	-	-	-
	Post-Check	1	30	230	30	230	4
	Total	1	30	230	30	230	4
Michigan	Pre-eradication	77	277	890	8,456	16,822	108
	Post-Check	108	13,192	31,668	14,021	32,057	160
	Total	185	13,469	32,558	22,477	48,879	268
Minnesota	Pre-eradication	9	-	-	247	547	23
	Post-Check	53	5,371	8,475	5,115	8,021	283
	Total	62	5,371	8,475	5,362	8,568	296
Wisconsin	Pre-eradication	35	-	-	1,399	6,293	21
	Post-Check	82	8,246	22,108	8,447	23,707	116
	Total	117	8,246	22,108	9,846	30,000	137
Region	Pre-eradication	131	277	890	10,247	24,137	159
	Post-Check	245	26,847	62,502	27,649	64,146	564
	Total	376	27,124	63,392	37,896	88,283	723





TABLE 2

SUMMARY OF LOCAL CONTROL BY STATES AND OWNERSHIP CLASSES  
NORTH CENTRAL REGION - 1957

State	Ownership Class	Workings	Number of Acres Worked	Acres		Man Days Used	Ribes Destroyed	Checking Summary		Contract Erection		
				White Pine Protected	Control Area Worked			Acres Worked and Checked	Acres Meeting Standard	Acres Worked	Average Price Per Acre Paid To Contractor	
ILLINOIS	Non-Federal Public	Rework	7	149	830	45	39,255	830	830			
	Private	Initial	9	155	508	5	801	508	508			
	Total	All	18	304	1,338	50	39,856	1,338	1,338			
IOWA	Non-Federal Public	Rework	1	30	230	144	17,038	230	230	-	-	
MICHIGAN	National Forests	All	51	8,192	14,008	855	113,590	14,008	14,008	9,163	\$0.43	
	Non-Federal Public	Initial	18	3,732	6,306	715	88,588	12,935	12,935	-	-	
		Rework	22	3,839	6,465	819	100,387					
		Maint.	8	1,080	1,705	74	6,246					
		All	46	8,651	14,495	1,808	195,201					
	Private	Initial	14	602	1,787	309	58,059	16,585	18,588	-	-	
		Rework	33	5,535	11,993	1,285	117,589					
		Maint.	9	1,832	2,905	28	5,491					
		All	58	7,769	16,885	1,802	178,119					
	Total	Initial	44	6,064	11,489	1,174	160,329	43,528	43,528	9,163	0.43	
		Rework	74	11,934	24,448	2,734	308,885					
		Maint.	35	4,614	9,231	157	17,696					
		All	163	22,612	45,166	4,065	486,910					
	MINNESOTA	National Forests	All	32	2,784	3,572	1,771	212,950	3,503	3,503	801	7.58
		Indian Reservations	All	9	500	831	443	28,993	778	776	-	-
		Non-Federal Public	Initial	3	84	218	137	52,997	1,141	1,141	-	-
			Rework	15	779	1,506	1,447	287,893				
			All	16	883	1,722	1,584	320,890				
Private		Initial	1	10	20	18	3,000	40	31	-	-	
		Rework	3	14	20	12	4,946					
		All	4	24	40	28	7,946					
Total		Initial	13	619	991	448	134,087	5,482	5,453	801	7.58	
		Rework	48	3,365	4,999	3,254	430,986					
		Maint.	2	187	175	126	5,524					
		All	63	4,171	8,185	3,826	570,579					
WISCONSIN		National Forests	All	12	3,170	6,866	1,124	171,073	3,011	3,011	-	-
		Indian Reservations	All	7	957	1,650	1,052	124,738	1,225	1,225	-	-
	Non-Federal Public	Initial	15	1,025	3,201	1,721	377,055	5,579	5,579	-	-	
		Rework	14	753	2,237	858	97,467					
		Maint.	3	343	1,148	223	34,076					
		All	32	2,121	6,586	2,802	508,598					
	Private	Initial	24	1,030	4,093	535	241,512	4,738	4,738	80	5.63	
		Rework	8	590	1,585	98	11,026					
		All	32	1,620	5,678	633	252,538					
	Total	Initial	46	3,416	10,100	2,868	726,441	14,553	14,553	80	5.63	
		Rework	30	3,203	8,727	2,089	228,232					
		Maint.	7	1,249	3,973	658	102,274					
		All	83	7,868	20,800	5,811	1,058,947					
	NORTH CENTRAL REGION	National Forests	Initial	28	3,338	8,518	744	182,928	20,522	20,522	9,984	1.01
Rework			47	6,219	11,032	2,872	315,736					
Maint.			22	2,591	6,916	134	18,949					
All			95	12,146	24,466	3,750	497,613					
Indian Reservations		Initial	2	280	460	309	41,738	2,003	2,003	-	-	
		Rework	10	793	1,316	706	53,281					
		Maint.	4	384	705	480	58,732					
		All	18	1,457	2,461	1,495	153,731					
Non-Federal Public		Initial	38	4,641	9,722	2,573	516,820	20,715	20,715	-	-	
		Rework	59	5,550	11,288	3,313	521,838					
		Maint.	9	1,423	2,853	297	42,322					
		All	104	11,814	23,863	6,183	1,080,780					
Private		Initial	48	1,797	6,388	885	300,172	21,871	21,862	80	5.63	
		Rework	44	6,139	13,598	1,375	133,541					
		Maint.	9	1,632	2,905	28	5,491					
		All	101	9,568	22,891	2,268	439,204					
Region Total		Initial	112	10,254	23,089	4,491	1,021,458	65,111	65,102	10,044	1.03	
		Rework	160	18,701	37,234	8,288	1,024,376					
	Maint.	44	6,030	13,379	939	128,494						
	All	318	34,985	73,701	13,896	2,171,328						





TABLE 3

SUMMARY OF LOCAL CONTROL ON FEDERAL LAND  
NORTH CENTRAL REGION - 1957

Ownership	National Forest or Indian Reservation	Workings	Number of Acres Worked	Acres		Man Days Used	Ribs Destroyed	Checking Summary		Contract Erediction	
				White Pine Protected	Control Area Worked			Acres Worked and Checked	Acres Meeting Standard	Acres Worked	Average Price Per Acre Paid To Contractor
NATIONAL FORESTS	Huron, Mich.	Initial	9	985	1,880	74	11,494	2,090	2,090	2,090	\$0.63
		Rework	1	195	410	30	8,733				
		All	10	1,160	2,090	104	20,227				
	Manistee, Mich.	Initial	1	25	67	2	40	4,843	4,643	4,643	0.18
		Rework	1	110	275	3	78				
		Maint.	19	1,892	4,301	39	2,820				
		All	21	1,827	4,843	44	2,938				
	Hiawatha, Mich.	Initial	1	260	760	2	12	1,405	1,405	-	-
		Rework	2	242	845	63	7,028				
		All	3	502	1,405	65	7,040				
	Marquette, Mich.	Rework	5	893	2,430	87	5,885	2,430	2,430	2,430	0.77
	Ottawa, Mich.	Initial	1	480	910	72	7,158	3,440	3,440	-	-
		Rework	9	1,120	2,210	467	69,205				
		Maint.	1	210	320	16	1,139				
		All	11	1,810	3,440	555	77,500				
	Superior, Minn.	Initial	9	525	755	293	78,090	2,800	2,800	801	7.56
		Rework	15	1,910	2,108	1,073	88,674				
		All	24	2,435	2,883	1,355	168,764				
	Chippewa, Minn.	Rework	8	349	709	405	45,188	703	703	-	-
	Chequamegon, Wis.	Initial	5	1,081	2,346	301	66,136	2,381	2,381	-	-
		Rework	4	890	1,815	533	81,483				
		Maint.	2	689	2,295	79	14,990				
		All	11	2,660	6,256	913	152,609				
	Nicolet, Wis.	Rework	1	510	630	211	8,464	630	630	-	-
	National Forest Total	Initial	26	3,356	8,518	744	162,928	20,522	20,522	9,984	1.01
		Rework	47	6,219	11,032	2,872	315,736				
		Maint.	22	2,591	6,916	134	18,949				
		All	95	12,148	24,466	3,750	497,613				
INDIAN RESERVATIONS	Nett Lake, Minn.	Maint.	2	167	175	126	5,524	175	175	-	-
	Red Lake, Minn.	Rework	7	333	656	317	23,469	603	603	-	-
	Lac Court Oreilles, Wis.	Maint.	2	217	530	354	53,208	530	530	-	-
	Menominee, Wis.	Initial	2	280	460	309	41,738	895	595	-	-
		Rework	3	460	850	389	29,792				
		All	5	740	1,120	598	71,530				
	Indian Reservation Total	Initial	2	280	450	309	41,738	2,003	2,003	-	-
		Rework	10	793	1,316	706	53,281				
		Maint.	4	384	705	480	58,732				
		All	16	1,457	2,481	1,495	153,731				
ALL FEDERAL	All Federal	Initial	28	3,616	6,978	1,053	204,866	22,525	22,525	9,984	1.01
		Rework	57	7,012	12,348	3,578	358,997				
		Maint.	28	2,975	7,621	814	77,581				
		All	111	13,603	26,947	5,245	651,344				





**TABLE 4**  
STATUS OF CONTROL BY OWNERSHIP CLASSES, NORTH CENTRAL REGION, ON DECEMBER 31, 1957

Ownership	National Forest, Indian Reservation or State	Control Area		Worked Initially			Premaintenance Work Remaining		On Maintenance	
		Acres of White Pine	White Pine and Protection Zone	Acres of White Pine	Acres of Control Area	Percent of Control Area	Initial Work	Rework	Acres of Control Area	Percent of Control Area
NATIONAL FORESTS	Hoosier, Ind.	16	179	16	179	100.0	-	-	179	100.0
	Wayna, Ohio	515	4,029	515	4,029	100.0	-	-	4,029	100.0
	Huron, Mich.	11,202	23,264	9,452	19,744	64.6	3,540	11,740	6,004	34.4
	Manistee, Mich.	31,493	86,856	31,140	87,727	96.9	931	9,802	78,125	66.1
	Hiawatha, Mich.	15,289	39,789	15,234	39,849	99.8	140	5,743	33,908	66.2
	Marquette, Mich.	11,702	25,720	11,702	25,720	100.0	-	2,768	22,932	69.2
	Ottawa, Mich.	12,050	23,273	12,050	23,223	99.6	50	11,347	11,878	51.0
	Superior, Minn.	34,150	48,781	26,028	36,525	79.0	10,228	21,683	18,862	34.8
	Chippewa, Minn.	13,048	22,071	12,914	21,749	98.5	322	8,248	15,504	70.3
	Chequamegon, Wis.	33,943	58,057	32,417	53,714	95.8	2,343	14,622	36,692	69.4
	Nicolet, Wis.	13,163	25,848	13,163	25,848	100.0	-	6,976	16,866	72.6
	All National Forests	178,581	357,457	188,853	339,905	95.1	17,552	90,928	246,977	89.6
INDIAN RESERVATIONS	Sac Fox, Iowa	50	500	50	500	100.0	-	294	208	41.2
	Grand Portage, Minn.	1,097	1,498	1,097	1,496	100.0	-	1,496	-	0.0
	Leech Lake, Minn.	1,094	1,839	1,060	1,596	97.4	43	523	1,073	85.5
	Nett Lake, Minn.	5,212	7,079	5,212	7,079	100.0	-	841	8,238	88.1
	Vermilion, Minn.	78	168	78	188	100.0	-	-	168	100.0
	White Earth, Minn.	502	1,058	502	1,056	100.0	-	511	545	51.6
	Red Lake, Minn.	12,606	19,443	12,293	16,635	95.6	808	3,711	14,924	76.6
	Bad River, Wis.	6,547	15,023	8,451	14,848	96.8	177	1,327	13,519	90.0
	Lac Court Oreilles, Wis.	15,174	26,865	14,115	25,356	95.0	1,327	2,834	22,724	85.2
	Lac du Flambeau, Wis.	14,411	28,001	14,411	26,001	100.0	-	-	28,001	100.0
	Menominee, Wis.	25,378	42,412	24,192	40,127	94.8	2,288	12,810	27,517	64.9
	All Indian Reservations	64,346	141,520	61,461	138,660	96.7	4,840	23,947	112,933	79.6
NON-FEDERAL PUBLIC LAND	Illinois	1,872	7,761	1,870	7,683	98.7	96	5,187	2,476	31.9
	Indiana	3,189	16,209	3,057	17,322	95.1	867	1,599	15,723	68.3
	Iowa	827	3,616	827	3,796	99.5	20	3,599	199	5.2
	Michigan	154,085	340,033	139,613	316,360	93.0	23,673	137,650	178,710	52.3
	Minnesota	56,072	116,945	35,725	89,878	58.7	49,087	49,246	20,630	17.3
	Ohio	6,767	33,693	7,161	29,562	67.7	4,131	6,125	21,437	83.8
	Wisconsin	154,910	430,707	149,626	412,211	95.7	16,496	217,107	195,104	45.3
	All Non-Federal Public Land	361,322	953,166	337,701	656,794	90.0	96,372	422,515	434,279	45.6
PRIVATE LAND	Illinois	1,095	5,896	1,012	5,391	91.4	505	3,912	1,479	25.0
	Indiana	7,560	74,196	8,146	61,983	63.5	12,213	10,970	51,013	86.6
	Iowa	2,465	10,551	1,215	6,684	63.2	3,867	4,809	2,055	19.5
	Michigan	228,919	742,450	195,598	634,238	85.4	108,212	373,303	260,935	35.1
	Minnesota	106,245	309,181	74,080	217,952	70.5	91,229	170,755	47,197	15.3
	Ohio	13,414	97,974	11,772	92,773	94.7	5,201	9,882	82,891	84.6
	Wisconsin	288,284	1,070,963	247,997	893,566	83.4	177,397	380,272	513,294	47.9
	All Private Land	648,002	2,311,211	537,830	1,912,567	82.8	398,644	953,703	958,864	41.3
TOTAL STATE AND PRIVATE LAND		1,029,324	3,264,377	875,531	2,769,361	84.8	495,016	1,376,218	1,393,143	42.7
TOTAL NORTH CENTRAL REGION		1,290,233	3,763,354	1,123,665	3,246,146	86.3	517,208	1,491,093	1,755,053	46.6
STATUS OF CONTROL BY AREAS, STATES AND DISTRICTS										
AREA I	Iowa	3,162	14,869	1,892	10,962	73.7	3,907	8,502	2,480	16.5
	Eastern Minnesota	106,255	250,171	87,782	155,931	62.3	94,240	117,970	37,961	15.2
	Western Minnesota	126,049	279,676	103,237	222,221	79.5	57,455	137,023	65,198	30.5
	All Minnesota	232,304	529,847	171,019	378,152	71.4	151,695	254,993	123,159	23.2
	AREA TOTAL	235,466	544,716	172,911	369,114	71.4	155,602	263,495	125,619	23.1
AREA II	Illinois	2,787	13,657	2,662	13,054	95.8	603	9,099	3,955	28.9
	Eastern Wisconsin	213,642	701,627	193,519	616,757	67.9	64,670	266,533	350,224	49.9
	Western Wisconsin	339,985	991,667	311,075	674,712	68.2	117,155	369,217	505,495	51.0
	All Wisconsin	553,627	1,693,294	504,594	1,491,469	86.1	202,025	635,750	655,719	50.5
	AREA TOTAL	556,594	1,707,151	507,276	1,504,523	86.1	202,628	644,849	659,674	50.4
AREA III	Indiana	10,747	92,564	9,221	79,464	65.9	13,100	12,589	88,915	72.3
	Ohio	22,716	135,696	19,468	128,384	93.1	9,332	16,007	108,357	79.9
	Lower Michigan	317,870	949,261	262,229	642,902	66.6	106,369	445,399	397,503	41.9
	Upper Michigan	147,040	333,946	132,580	303,759	91.0	30,167	106,774	198,965	59.0
	All Michigan	464,710	1,283,207	414,769	1,146,661	69.3	136,546	552,173	594,466	48.3
	AREA TOTAL	496,173	1,511,467	443,476	1,352,509	69.5	156,976	562,749	789,760	50.9





CURRENT AND CUMULATIVE CANKER PRUNING, NORTH CENTRAL  
REGION. FROM INCEPTION TO DECEMBER 31, 1957

State	Ownership Class	No. of Areas Treated	Number of Trees			No. of Cankers Removed	Man Days Used
			Examined	Removed	Treated		
Calendar Year 1957							
Iowa	State Park	1	2,500	2	7	13	5
Mich.	National Forest	1	4,800	450	630	1,900	20
Minn.	State Park	4	132	-	54	83	3
	State Hospital	1	535	181	118	131	16
	Walker, Minn.	2	80	-	7	13	2
	Total	7	747	181	179	227	21
Wis.	National Forest	1	3,990	440	390	570	7
	Non-Fed. Public	4	21,633	22	1,496	1,921	40
	Private	1	15,000	300	1,500	2,000	50
	Total	6	40,623	762	3,386	4,491	97
Region Totals		15	48,670	1,395	4,202	6,631	143

Cumulative to December 31, 1957

Indiana	All	4	973	-	8	11	1
Iowa	All	91	79,592	1,226	1,183	2,598	128
Michigan	All	403	877,976	2,770	62,661	126,998	4,112
Minnesota	All	218	561,997	8,681	55,346	93,149	2,386
Ohio	All	5	1,306	13	44	126	15
Wisconsin	All	30	499,153	6,936	41,981	52,792	762
Region Totals		751	2,020,997	19,626	161,223	275,674	7,404

TABLE 6

NURSERY SANITATION PERFORMED  
NORTH CENTRAL REGION, 1957  
(All in Wisconsin)

Ownership and Name of Nursery	Working	White Pine	Acres Protected	/acres in Sanitation Zone	Ribes Destroyed	Man Days Used
		Trees in Nursery (Thousands)				
Boscobel State	5	4,000	130	600	849	75
Gordon State	14	680	35	373	401	30
Griffith State	11	8,500	95	535	179	60
Hayward State	14	2,000	100	572	12,491	63
Hugo Sauer State	13	100	20	405	47	67
Total	-	15,280	380	2,485	13,967	235





TABLE 7

APPROXIMATE NUMBER OF MAN-MONTHS EMPLOYED  
BY MONTHS, AGENCIES AND STATES  
NORTH CENTRAL REGION - CAL. YEAR 1957

Agency	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Average per Month
ILLINOIS														
State & Private	1.0	1.0	1.0	2.0	3.0	3.0	1.0	1.0	1.0	1.0	1.0	1.0	17.0	1.4
IOWA														
State & Private	-	-	-	-	-	0.5	4.0	1.0	-	-	-	-	5.5	0.5
FS - 712-720	1.0	1.0	1.0	-	-	-	-	-	-	-	-	0.6	3.6	0.3
FS - 432-411	-	-	-	-	-	0.2	1.0	1.0	0.3	-	-	-	2.5	0.2
Total	1.0	1.0	1.0	-	-	0.7	5.0	2.0	0.3	-	-	0.6	11.6	1.0
MICHIGAN														
State & Private	1.9	2.1	2.0	1.6	20.1	57.4	34.4	37.3	26.6	2.4	1.6	1.7	169.5	15.6
FS - 712-720	2.5	1.6	1.5	1.5	0.6	0.5	2.5	2.5	2.5	2.5	2.5	2.5	23.4	1.9
FS - 411-432	1.0	1.7	2.0	2.2	5.7	7.5	7.0	6.6	5.0	1.0	1.0	1.0	41.9	3.5
National Forests	-	-	-	-	15.4	15.2	13.4	6.6	-	-	-	-	50.6	4.2
Total	5.4	5.6	5.5	5.3	41.6	60.6	57.3	53.4	34.3	5.9	5.3	5.2	305.6	25.4
MINNESOTA														
State & Private	-	-	-	-	3.9	15.6	27.9	12.1	1.2	0.6	-	-	61.5	5.1
FS - 712-720	3.3	3.2	3.3	1.6	1.5	5.1	3.0	3.0	3.0	3.0	3.3	3.6	36.9	3.3
FS - 432-411	1.0	0.7	0.3	3.0	3.7	4.0	6.5	5.9	1.5	1.1	1.0	1.0	29.7	2.5
National Forests	-	-	0.5	-	6.0	14.0	35.9	40.7	1.1	0.5	-	-	100.7	6.4
Indian Service	-	-	-	-	11.1	10.5	-	1.0	1.0	1.0	1.0	1.0	26.6	2.2
Total	4.3	3.9	4.1	4.6	26.2	49.4	73.3	62.7	7.6	6.2	5.3	5.6	255.4	21.3
WISCONSIN														
State & Private	2.0	2.0	3.0	3.0	12.0	45.4	45.0	43.5	27.0	16.5	2.0	2.0	203.4	17.0
FS - 712-720	2.5	3.5	3.0	1.5	1.5	1.5	3.5	3.5	3.5	3.5	3.5	3.5	34.5	2.9
FS - 432-411	-	-	0.6	4.0	6.9	11.5	16.0	13.3	4.4	5.0	3.7	-	67.6	5.6
National Forests	-	-	-	1.0	2.5	19.5	25.0	16.5	7.0	0.6	0.5	-	74.6	6.2
Indian Service	-	-	-	0.2	10.3	12.3	0.3	1.3	1.3	0.1	0.1	-	25.9	2.2
Forest Pest Cont.	-	-	-	0.5	1.5	-	-	-	-	-	-	-	2.0	0.2
Total	4.5	5.5	6.6	10.2	36.7	90.2	69.6	60.1	43.2	25.7	9.6	5.5	406.0	34.0
REGIONAL OFFICE														
FS - 712-720	3.0	3.0	3.0	3.0	3.4	3.4	3.4	3.0	3.0	3.0	3.0	3.0	37.2	3.1
Forest Pest Cont.	1.0	1.0	1.0	1.0	3.0	2.6	1.0	1.0	1.0	1.0	1.0	1.0	15.6	1.3
Total	4.0	4.0	4.0	4.0	6.4	6.0	4.4	4.0	4.0	4.0	4.0	4.0	52.8	4.4
TOTAL REGION														
State & Private	4.9	5.1	6.0	6.6	39.0	122.1	112.3	94.9	56.0	20.5	4.6	4.7	476.9	39.7
FS - 712-720	12.3	12.5	11.6	7.6	7.0	10.5	12.4	12.0	12.0	12.0	12.3	13.4	135.6	11.3
FS - 432-411	2.0	2.4	3.1	9.2	18.3	23.2	30.5	27.0	11.2	7.1	5.7	2.0	141.7	11.8
National Forests	-	-	0.5	1.0	25.9	48.7	74.3	66.0	6.1	1.1	0.5	-	226.1	16.6
Indian Service	-	-	-	0.2	21.4	22.6	0.3	2.3	2.3	1.1	1.1	1.0	52.5	4.4
Forest Pest Cont.	1.0	1.0	1.0	1.5	4.5	2.6	1.0	1.0	1.0	1.0	1.0	1.0	17.6	1.5
Total	20.2	21.0	22.4	26.1	116.1	229.9	230.6	203.2	90.6	42.8	25.4	22.1	1,050.6	67.6



TABLE 8

EXPENDITURES, NORTH CENTRAL REGION, CALENDAR YEAR 1957  
BY STATE AND SOURCE OF FUNDS

Source of Funds	ILLINOIS	IOWA	MICHIGAN	MINNESOTA	WISCONSIN	REGIONAL OFFICE	TOTAL
State Indirect Aid							
January - June	\$210	\$480	\$675	\$1,750	\$8,100	-	\$11,215
July - December	210	480	675	1,750	8,100	-	11,215
State Direct Aid							
January - June	5,024	80	22,022	7,635	22,205	-	56,966
July - December	3,467	866	26,549	10,060	26,211	-	69,153
Sub-Total, State	8,911	1,906	49,921	21,195	66,616	-	148,549
Forest Service							
January - June 712	99	1,478	5,941	9,270	6,693	\$14,880	38,361
July - December 720	47	369	9,392	12,559	10,581	17,500	50,448
Forest Service							
January - June 432	-	145	9,088	5,399	11,811	976	27,419
July - December 411	-	917	10,671	6,080	12,144	600	30,412
National Forests							
January - June	-	-	6,382	9,246	5,135	2,176	22,939
July - December	-	-	5,478	24,374	12,844	2,000	44,696
Indian Service							
January - June	-	-	-	5,612	8,187	-	13,799
July - December	-	-	-	1,281	819	-	2,100
Forest Pest Control							
January - June	-	-	-	1,552	1,375	6,000	8,927
July - December	-	-	-	-	-	7,500	7,500
Sub-Total, Federal	146	2,909	46,952	75,373	69,589	51,632	246,601
All Funds							
January - June	5,333	2,183	44,108	40,464	63,506	24,032	179,626
July - December	3,724	2,632	52,765	56,104	72,699	27,600	215,524
Region Total	9,057	4,815	98,873	96,568	136,205	51,632	395,150

TABLE 8 A  
EXPENDITURES BY ACTIVITY AND STATE

State or Source of Funds	Program Planning Direction	Surveys and Checking	Ribes Eradication	Nursery Protection	Canker Pruning	Methods Studies	Educa- tional Work	Forest Pest Control	Total
Illinois	2,126	600	2,713	-	-	600	3,018	-	9,057
Iowa	1,815	173	2,181	300	173	-	173	-	4,815
Michigan	8,730	9,293	78,050	-	-	-	800	-	96,873
Minnesota	7,796	14,004	62,606	500	281	8,145	1,704	1,552	96,568
Wisconsin	5,800	9,557	94,128	3,170	1,352	18,956	1,867	1,375	136,205
Regional Office	32,132	3,000	-	-	-	2,000	1,000	13,500	51,632
Region Total	58,399	36,627	239,678	3,970	1,786	29,701	6,562	16,427	395,150

TABLE 8 B  
EXPENDITURES BY ACTIVITY AND SOURCE OF FUNDS

State Indirect Aid	6,450	-	380	800	-	14,400	400	-	22,430
State Direct Aid	2,000	9,090	103,158	2,005	1,370	4,858	3,638	-	126,119
Forest Service 712-720	43,348	13,782	16,729	60	207	10,279	4,404	-	88,809
Forest Service 432-411	2,358	9,457	44,665	1,105	102	94	50	-	57,831
National Forests	4,243	2,548	60,597	-	107	70	70	-	67,635
Indian Service	-	1,750	14,149	-	-	-	-	-	15,899
Forest Pest Control	-	-	-	-	-	-	-	16,427	16,427
Region Total	58,399	36,627	239,678	3,970	1,786	29,701	8,562	16,427	395,150
Percent Each Activity	14.8	9.3	60.6	1.0	0.5	7.5	2.2	4.1	100.0













